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New Orleans District

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Report Number: COELMN/PD-89/02

**EVALUATION OF THE
NATIONAL REGISTER ELIGIBILITY
OF THE VERMILION LOCK,
VERMILION PARISH, LOUISIANA**

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FINAL REPORT

DECEMBER 1988

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December 2, 1988

Planning Division
Environmental Analysis Branch

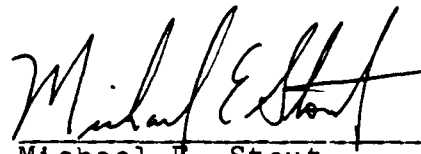
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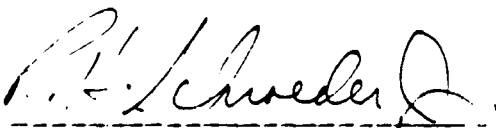
This report was funded and guided by the U.S. Army Corps of Engineers, New Orleans District. The historic site documented here is an installation built by the Army Corps of Engineers more than 50 years ago. This study acknowledges that increasing numbers of facilities built by the Corps are reaching the 50 year age criterion for consideration for eligibility to the National Register of Historic Places. Qualifying for this distinction requires more than just the passage of time, however. A structure must be shown to have architectural or engineering significance, and/or be associated with a person, place, or event of historical significance. We agree with the Contractor's assessment that the Vermilion Lock does not have these qualities. We do think, though, that the story of the lock is an instructive historical footnote of general interest to Corps of Engineers personnel, the historic preservation community, and the public.

The study is a result of our decision to relinquish the Federal Government interest in title to the Vermilion Lock and appurtenant lands. The lock has been abandoned since its replacement in 1985 by the Leland Bowman Lock. Relinquishing title means that the site will no longer have the protection which is afforded Federally administered cultural resources.

This report has been reviewed and accepted by the New Orleans District. We commend the Contractor's efforts and careful scholarship.


Van Tries Button
Technical Representative


Michael E. Stout
Authorized Representative
of the Contracting Officer


R. H. Schroeder, Jr.
Chief, Planning Division

EVALUATION OF THE NATIONAL REGISTER ELIGIBILITY OF THE VERMILION LOCK, VERMILION PARISH, LOUISIANA

by

Jeffrey Treffinger

1988

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Introduction

The following report was executed for the New Orleans District, Corps of Engineers in fulfillment of Contract No. DACW29-88-D-0123. The document assesses the issues related to the potential National Register eligibility of the Vermilion Lock, Vermilion Parish, Louisiana. The lock is examined in terms of its design and operations, and it is critically assessed.

The discussions which follow begin with the natural environment in which the lock was constructed. The Vermilion facility was built along the Gulf Intracoastal Waterway (GIWW) at a critical point between the Sabine and Atchafalaya Rivers (Figure 1). The lock functioned as both a navigation and a guard structure. The region near the lock is rich in agriculture, livestock, and wildlife. An intended function of the lock was to stop salt water from entering the Mermentau River Basin from Vermilion Bay, and hence, from the Gulf of Mexico (Figure 2).

The natural events which affect the conditions at the lock will be explained, and the resultant impacts to the structure presented. These impacts will be explained through descriptions of standard operational procedures at the lock. In other words, how was the lock operated in reaction to these natural phenomena? In addition, explanations of daily activities at the lock will clarify the operation of machinery and mechanisms. The operation of all machinery at the lock will also be critically assessed and viewed against original design intentions.

The Vermilion Lock is located 26 miles south of Abbeville, Louisiana; it is 1.75 miles west of the Vermilion River (Figure 2). It was completed in 1933 at a cost of \$330,000.00. The usable dimensions of the lock are 56 feet wide and 1,182 feet long (Figure 3). The depth above sill is 11.3 feet below mean low gulf level (m.l.g.). The significance of these dimensions is extremely important to this National Register assessment. Originally, there were twelve buildings associated with the lock complex. Today, only seven remain. All structures were examined, photographed, and documented using State Standing Structure Forms. None were found to be historically significant. All documentation relating to these buildings is contained in Appendix 1 of this report.



Figure 1. Location of Project Area (C.O.E. Vermilion files, F.Y. 1978).

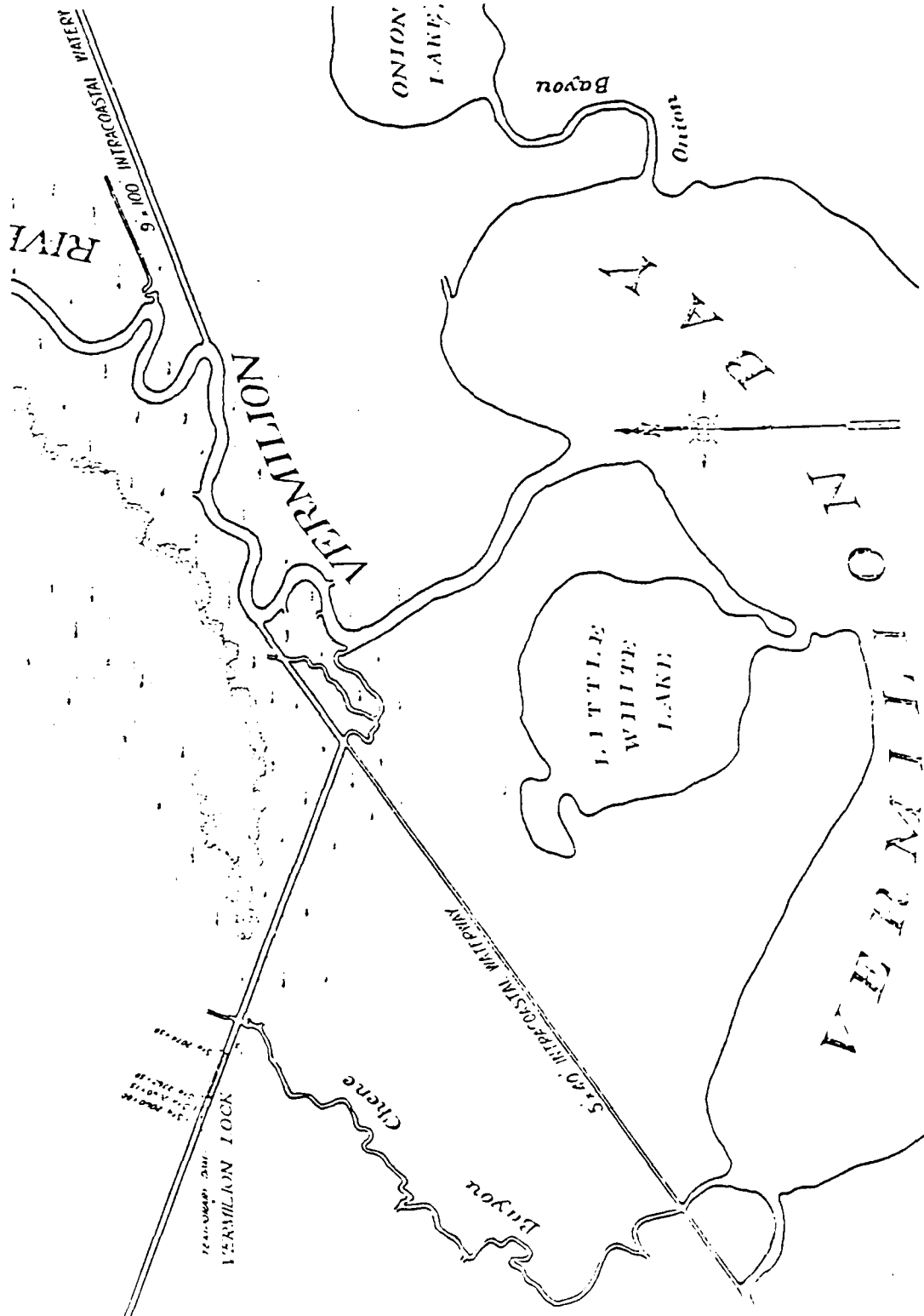


Figure 2. GIWW, Vermilion River and Bay
(Courtesy New Orleans District, C.O.E.).

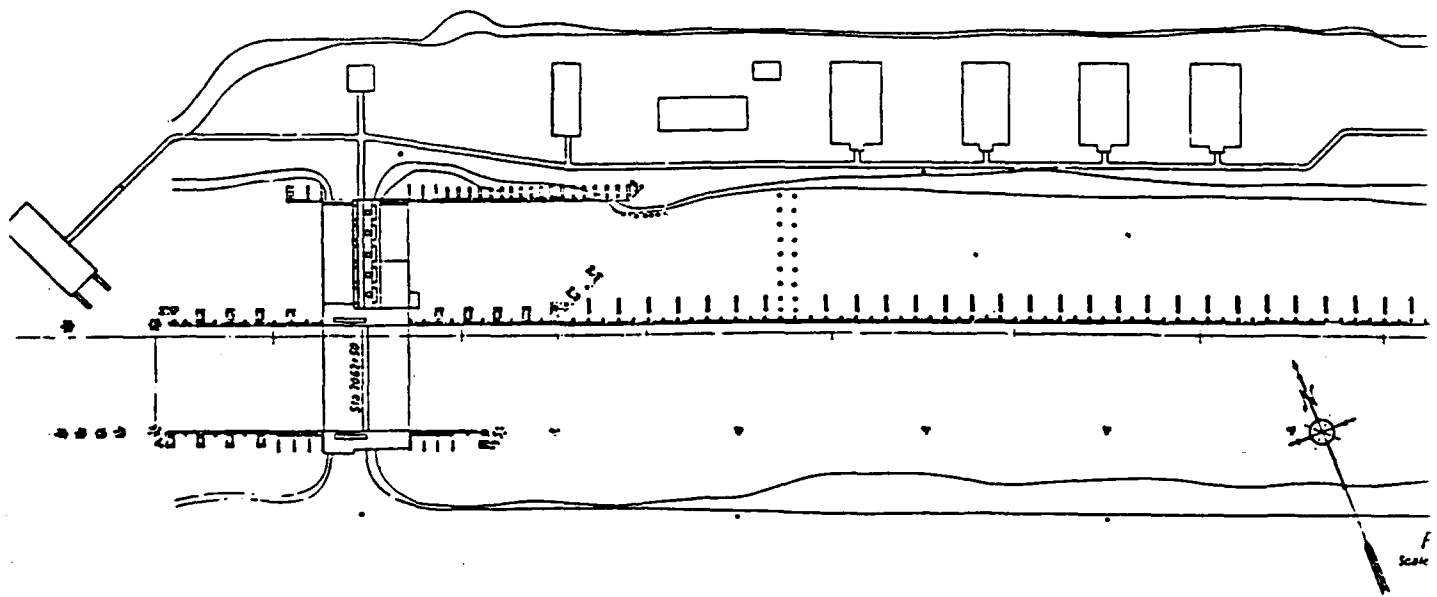


Figure 3. Plan of Vermilion
(Courtesy New Or

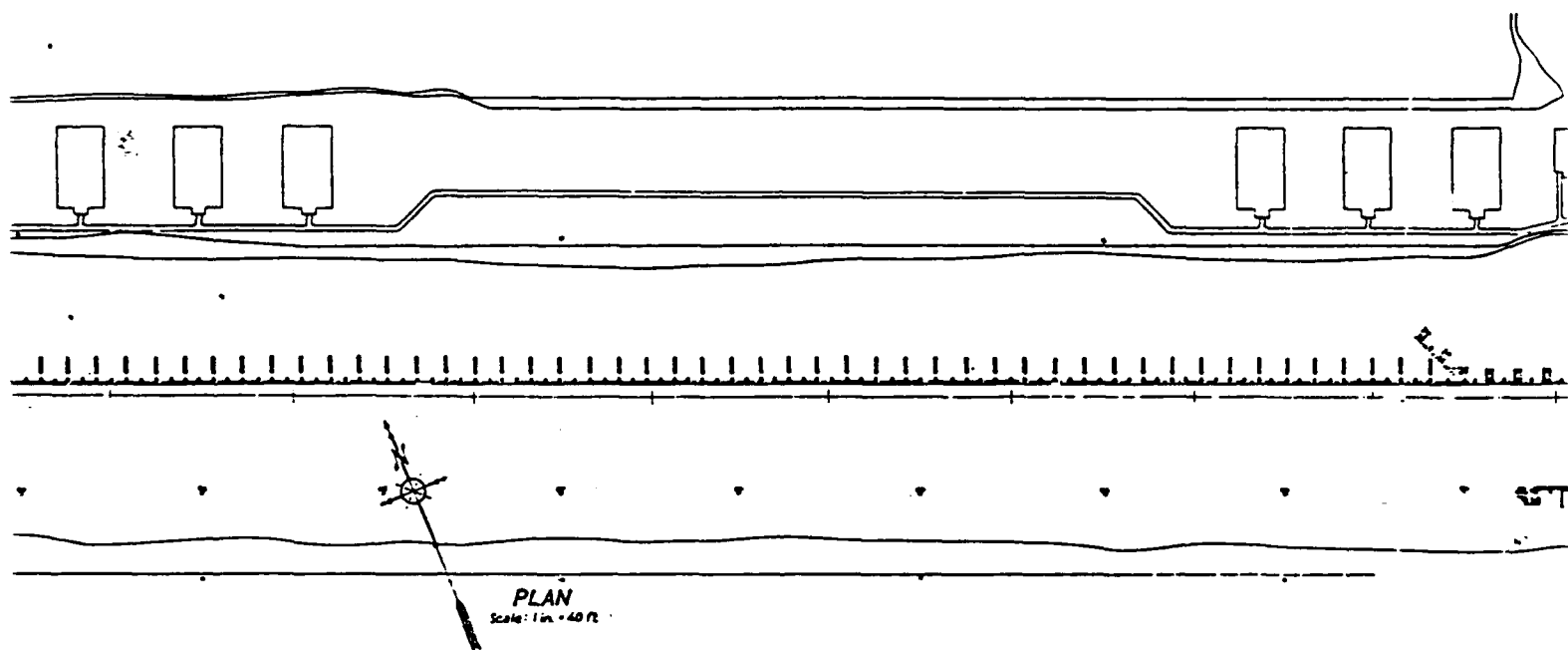
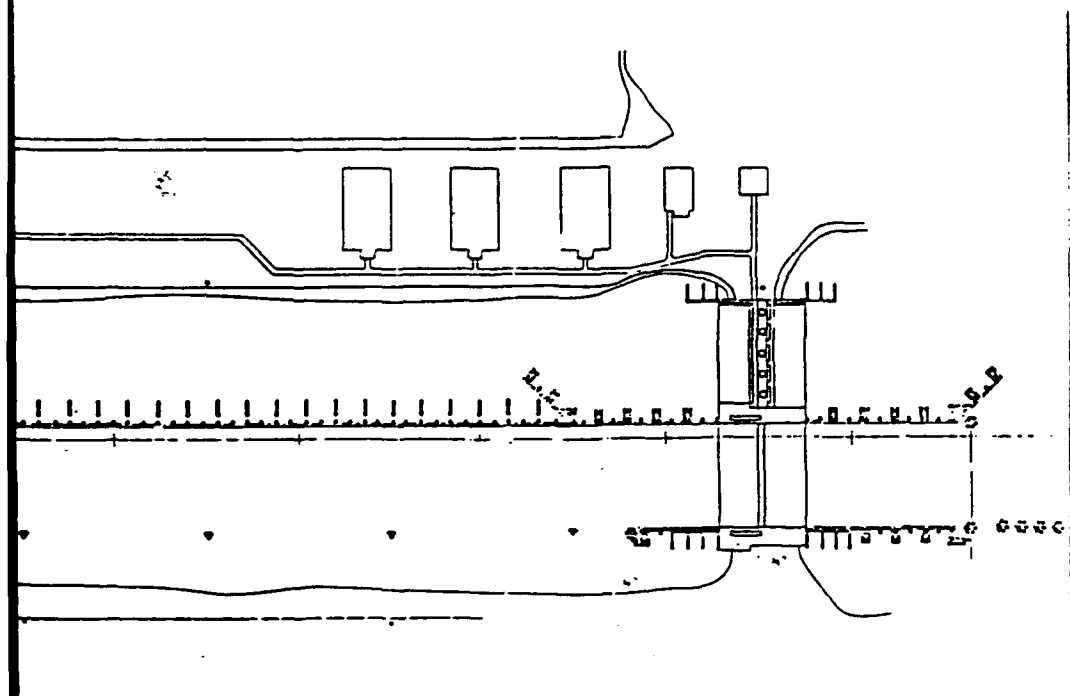


Figure 3. Plan of Vermilion Lock Complex
(Courtesy New Orleans District, C.O.E.).



Critical to this National Register assessment is the integrity of the originally designed and constructed components of the lock. Vermilion was built as an earthen chamber lock with concrete structures housing the gate and sluice apparatus at both the east and west ends (Figure 4). A section of this report will examine all modifications to the original design. Reasons for and results of these changes are discussed as well. Further, all maintenance related activities will be explained insofar as they relate to this determination of potential eligibility. It must be understood what modifications to the original structure were necessary to keep the lock operational and open for marine traffic.

The Vermilion Lock placed serious limitations upon the shipping industry and thereby, the economic development of areas adjacent to the GIWW. Much of this was the result of the small dimensions of the lock, which constrained large and heavy marine traffic. In addition, the lock was sometimes dangerous to navigate. These circumstances will be discussed in detail.

All components of the original design will be assessed. The need for certain modifications to the structure will be examined, as well as the impact of those modifications upon design integrity. In short, the Vermilion Lock will be critically examined as a working machine with specific design intentions. These specific intentions were not met and/or became antiquated. This resulted in the construction of the Leland Bowman Lock in 1985 which replaced Vermilion. The events and decisions associated with this project will be presented.

The final chapter addresses the historic themes associated with the construction of Vermilion Lock. The importance of the lock within these contexts will be assessed in terms of the criteria established by the National Park Service (36 CFR 60.4). The significance of the lock within the historic development of the sciences of structural and mechanical engineering is also discussed in this section. Finally, the status of the Vermilion Lock with regard to potential National Register eligibility is addressed.

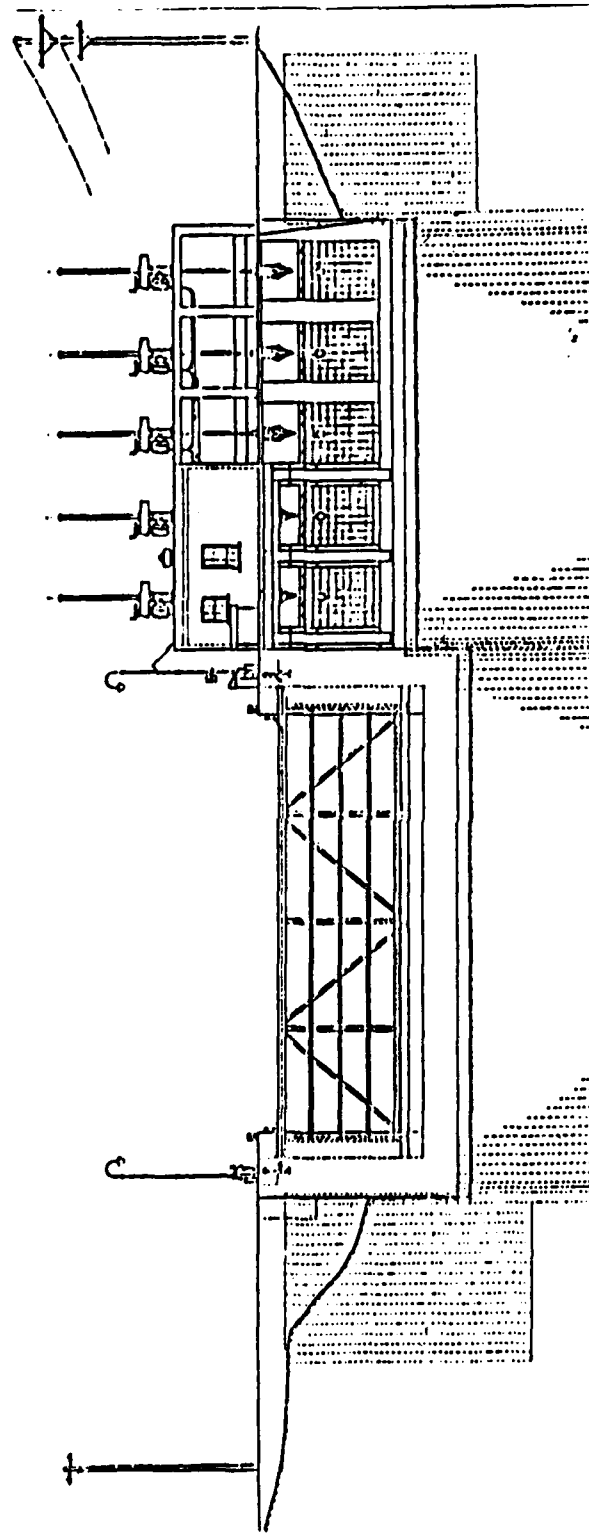


Figure 4. Cross section of Vermilion Lock showing gates and sluiceways (Courtesy New Orleans District, C.O.E.).

CHAPTER 2

ENVIRONMENTAL CONCERNS

Introduction

A delicate balance between wildlife, agriculture, and industry exists in the coastal area of Southern Louisiana. Critical to this balance are guard structures such as the Vermilion Lock, the Calcasieu Lock, the Catfish Point Control Structure and the Schooner Bayou Control Structure. The purpose of these four facilities is to stabilize the environment of the Mermentau Basin as well as to provide efficient avenues for shipping. This is no easy task, as the following quote on the Vermilion and Calcasieu Locks indicates:

They are operated in a manner to keep enough water for irrigation purposes, to limit the water for cattle grazing purposes, to, control the water for fish and wildlife purposes, and also for flood control purposes. To unconditionally open any of the structures in the basin would be harmful to all interests concerned (Nettles to William C. McNeal, Oil Transport Co., 7 April 1975).

The Mermentau River Project was authorized by the River and Harbor Act of 1946, and was completed as planned in 1952. This plan provided for improvements for flood control, navigation, irrigation, and the prevention of saltwater intrusion into the Mermentau Basin. The Vermilion Lock was designed to conserve fresh water for use in the Mermentau Basin as well as to provide an outlet for flood waters. The improvements under this Act also included the enlargement of the Mermentau River below Grand Lake and of the channels between Grand and White Lakes. In addition, channels between White Lake and Vermilion Bay were to be improved for the purpose of discharging flood waters. Finally, provisions included construction of control structures at Schooner Bayou and at Catfish Point. These facilities are located in the White Lake channel and are key in preventing salt water intrusion.

The four guard structures noted above also serve to protect the Mermentau Basin from serious tidal fluctuations. As a result, water levels at the western, or basin end of Vermilion Lock fluctuated less than those on the eastern end. A minimum stage of 0.0 m.l.g. (Mean Low Gulf elevation) is maintained in the Mermentau Basin by the introduction

of fresh water through the Schooner Bayou Control Structure. The control of fresh water is critical to the rice farmers of the region. The area west of the Vermilion facility is one of the richest rice growing regions in the country. The first rice farm is located about 3 or 4 miles to the west of the lock, and from there rice is farmed continuously for 20 to 30 miles (Harold Trahan, personal communication 1988).

Salt Water Control

The Vermilion and Calcasieu Locks control the salinity level of water in the Mermentau River Basin. If either of these structures were to be left open the subsequent salt water intrusion would severely damage agricultural productivity in the region. Consequently, when salt water lapped at the tops of the Vermilion lock gates, it was impossible to drop the gates to let the boats run. This would have resulted in salt water intrusion, which would have adversely affected local rice crops.

The gates of the Vermilion Lock could not be lowered when the outside (Gulf) elevations were at a level of 4.0 m.l.g. or above. This level put salt water at the tops of the gates. In such instances, all navigation through the lock ceased and was either diverted or halted until the Gulf waters receded.

Flood Protection

In order for rice to be successfully grown along lands adjacent to the GIWW, water stages of 2.6 feet above m.l.g. must be kept to a minimum. An elevation of 2.0 m.l.g. was agreed by local interests and the New Orleans District as being an optimum operating level; it became standard operational procedure. The lock gates were lowered to provide drainage to the east when levels above 2.0 m.l.g. occur. The Vermilion Lock is located in an ideal location for this purpose; when the gates were opened relief from flood waters was almost immediate:

... it was found that a quick lowering of flood stages in the Forked Island area could be obtained by lowering both tumbler type gates and using the lock for discharge of floodwaters (New Orleans District, C.O.E. 1965).

When both gates of the Vermilion Lock were opened to permit drainage, the velocity of the water flowing through the lock obviously increased. Velocity was proportional to the differential between east and west. In addition, when there was occasional drawdown at the east end of the lock (associated with tidal fluctuations), the current through the lock

increased. On average, the gates at Vermilion were opened about four times a year, and each opening lasted an average of 13 days.

If the Basin experiences dry conditions, the Corps of Engineers can alleviate some of the problem by utilizing the Teche-Vermilion Pumping Station near Krotz Springs. The station pumps fresh water out of the Atchafalaya River and into Bayou Teche near Port Barre; from there it flows into the Vermilion River. The additional fresh water is not substantial, but it does help support the rice fields. This system of flooding the Mermentau Basin can also be used when the salinity levels increase beyond desirable levels. Activating the Teche-Vermilion Station serves to flush the basin of high concentrations of salt water (Harold Trahan, personal communication 1988).

Despite the planning and the best intentions of the designers, the Vermilion Lock did not provide the kind of protection necessary to maintain regional demands for agriculture, grazing, and shipping. In a letter to the Chief of Planning for the New Orleans District, Mr. Hugh L. Brownlee, then Chief of Operations stated:

Vermilion Lock is not adequate for flood control. High outside tides and strong southerly winds cause overtopping of the gates which are set at 4.0 m.l.g.. Navigation is stopped at this point and floodwaters flow into the basin. In addition, gates cannot be lowered in case of any emergency to pass navigation when tides exceed 4.0 m.l.g.. Significantly, severe storms and hurricanes threaten the basin with floodwaters running over the gates at Vermilion Lock (Hugh L. Brownlee to Mr. Breerwood, 20 April 1973).

Conclusions

The Vermilion Lock did serve to protect the Mermentau Basin from crop damage and loss of grazing pasture. The issue of anticipated improvements to drainage associated with the construction of the Leland Bowman Lock testify that sufficient protection was provided by Vermilion:

The net benefits are of the agricultural operations is such as to preclude any significant expansion as a result of the replacement lock. Ricelands in the vicinity of Forked

Island are at a very low elevation and require pumps for drainage. Some improvement in gravity drainage may be obtained but is considered insignificant (New Orleans District, C.O.E. 1965:26).

However, these benefits were obtained at the expense of shipping. While the lock drained waters from the Basin, navigation was severely impeded. The Vermilion Lock's impact on shipping is discussed in detail in a later section, below.

In addition, the elevation of the lock seemed to have been too low for adequate control of salt water intrusion. There are many documented situations of tidal stages above 4.0 m.l.g (the height of the Vermilion gates). It is therefore clear that the original design was deficient with regards to these important functional issues.

CHAPTER 3

SEASONAL AND NATURAL PHENOMENA

East End

The tides of the Gulf of Mexico effect the differential at the eastern end of the lock. These tides are controlled by certain variables: the stages of the moon as well as seasonal tides. During the fall and winter months, exceptionally low Gulf tides occur. Shipping delays due to the volume of water moving to the Gulf from the Mermentau Basin were high during these months:

A study of water stages at the east gate reveals that the water surface has been depressed as much as 2.9 feet below m.l.g.. Such a depressed water surface leaves only 8.4 feet of water over the east gate sill. While this is the maximum recorded depression in the water surface at the east gate, stages below mean low Gulf level are common. Such stages, while more frequent during the fall and winter months, have occurred in all months of the year except July, August, and September (New Orleans District, C.O.E. 1965:17).

Other influences on the Gulf tide include storms. When hurricanes move toward the Gulf coast, a large volume of water is pushed ahead of the storm system. This storm surge moves salt water toward the Mermentau River Basin. It was anticipated that the Vermilion facility would check this intrusion of salt water, restricting its flow into the basin.

West End

The inside, or western water elevation is influenced by the seasonal ongoings in the Mermentau River Basin (Figure 5). Many channels, bayous and streams cross this area rich in wildlife and agriculture. Just as Gulf storms push salt water northward, the Basin experiences sustained northern winds that push large amounts of fresh water toward the Gulf (Table 1). These winds may occur for days on end and result in a large



Figure 5. Aerial view of Vermilion Lock looking toward Mermentau River Basin (Courtesy New Orleans District, C.O.E.).

WIND DATA LAKE CHARLES (WB) AIRPORT

From charts prepared by U. S. Department of Commerce, 1964 Edition
21 years of record

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Fastest mile Direction	46 SSE	42 SSE	55 NW	45 SSE	60 WNW	69 SE	45 S	43 SSE	50 NE	42 NNE	46 WSW	50 S	69 SE
Mean speed Prevail. direction	10 N	10 N	10 S	10 SE	9 S	8 S	6 S	6 SW	7 NE	7 N	9 N	9 N	8 S

Table 1. Wind Data Lake Charles (WB) Airport
(C.O.E. Vermilion Files, F.Y. 1976-77).

differential elevation at the west gate of Vermilion. A primary function of the lock was to drain the Basin flood waters and to maintain a consistent water elevation. When fresh water reached levels exceeding 2.0 feet above m.l.g. the Vermilion gates were opened to discharge water.

High Basin levels also resulted from heavy spring rains; these are virtually yearly occurrences. Again, if the water level on the inside rose above 2.0 m.l.g., the gates were opened. On calm, still days, when there is no wind or flooding, the effective differential between east and west is as little as 2 or 3 inches (Harold Trahan, personal communication 1988). Lock records show that the gates at Vermilion were open for the discharge of floodwaters on average of about four times a year. The average duration of each opening was about 13 days (Harold Trahan, personal communication 1988).

CHAPTER 4

OPERATING PROCEDURES: VERMILION LOCK COMPLEX

Introduction

The following section is intended to explain the daily operations of the Vermillion Lock. Issues addressed here include the machinery on site as well as the procedures involved in locking and maintenance activities. In addition, the functional aspects of the lock with regards to protecting the Mermentau Basin from salt water intrusion and flood control are discussed. This section is a description rather than a critical analysis of the design and subsequent operation of the lock complex. Operational problems noted below will be discussed in greater detail in subsequent section of this report.

Water Levels

Throughout this text, the terms "inside" and "outside" will be used to refer to the location of water levels on either side of the lock. The inside level refers to the Mermentau River Basin or the western end of the Vermilion Lock. The outside level to the tidal influence of the Gulf of Mexico or those levels which occur at the eastern end of the Vermilion Lock. As noted above, one of the most important functions of the lock was to maintain a consistent water level in the Mermentau River Basin. This level was agreed to by both the Corps of Engineers, local rice farmers, and local livestock herders in 1977. This inside optimum level was set at 2.0 feet above m.l.g. Therefore, the lock regulated the water in the basin by holding it and draining water out when elevations reach levels above 2.0 m.l.g..

When water levels in the Mermentau Basin were above 2.0 m.l.g., the gates were lowered to allow the basin to drain. These gates (Figure 6) lay toward the east, or Gulf side of the chamber. As a result, it was very difficult to get the gates back up; this involved raising them against the current. The former lockmaster stated that in fact it was impossible to raise the gates with anything greater than a 4" differential head (Harold Trahan, personal communication 1988). The gates were then kept in the lowered position until this level was achieved. This could take several days depending upon the level of flooding and/or the direction of the wind. While the gates were down, traffic had to navigate against

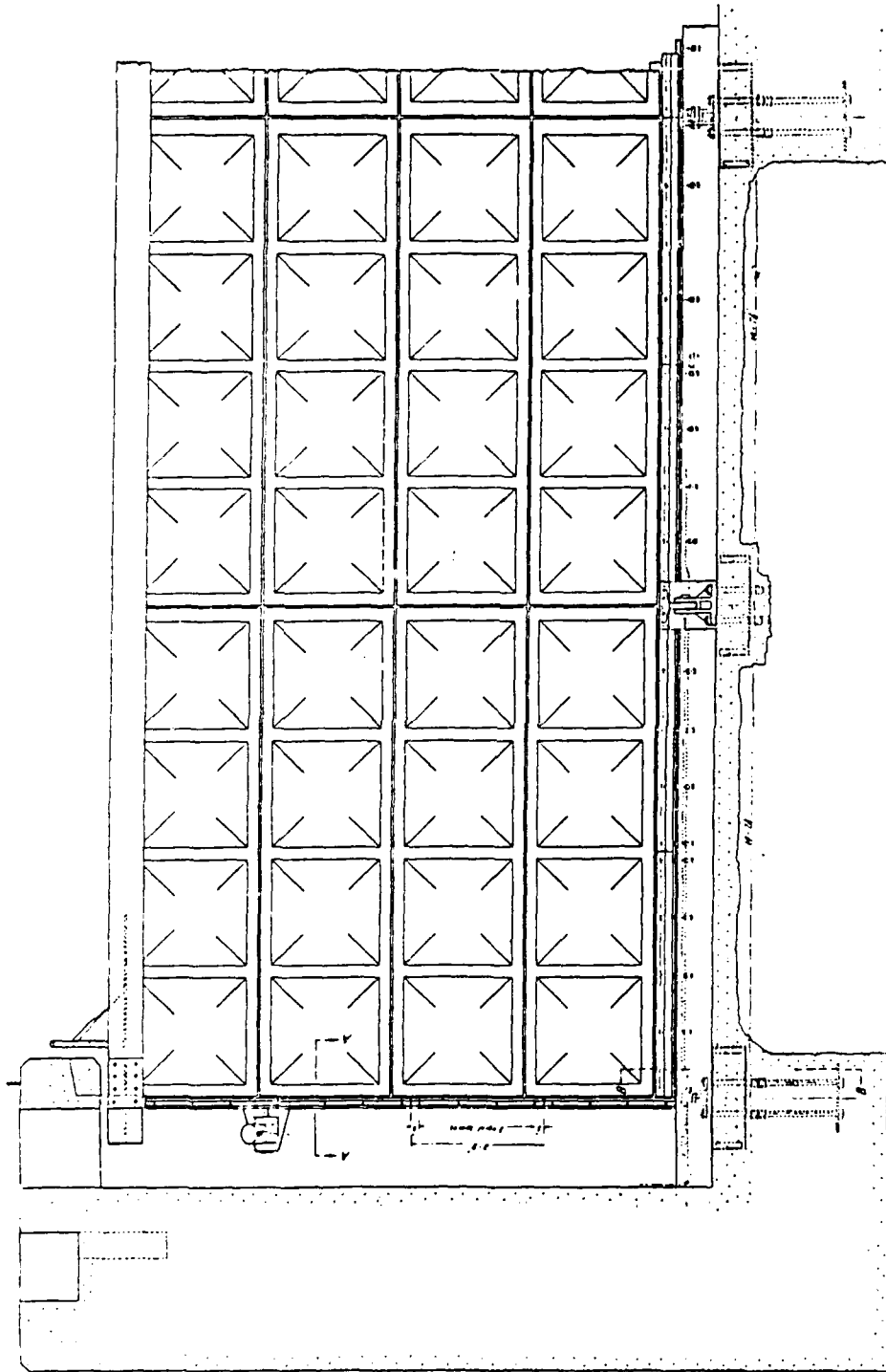


Figure 6. Elevation of gate at Vermilion Lock. Note: drawing represents one half of the gate (Courtesy New Orleans District, C.O.E.).

powerful currents. These conditions often resulted in damage to various components of the Vermilion Lock facility.

Lock Chamber

The Vermilion Lock was constructed with an earthen chamber; the only concrete in the lock chamber is located in the areas of the east and west gate/sluice valve structures (Figure 7). The sides of the chamber are reinforced with sheet piles to combat erosion. The width of the chamber is 56 feet and the length is 1,182 feet; the sill is 11.3 feet below mean low gulf level. The chamber is divided in the center by a walkway. To the north of this walkway is the sluice valve chamber; to the south is the navigation chamber. Although the chamber is divided by this walkway, water passes between the pilings which support it and it functioned as one large chamber. Crossing the center of the sluice valve chamber is a second wooden walkway (Figure 8); this was used in case of fires as a pump platform.

Sluice Valves

The water levels in the lock were controlled by the sluice valves. These valves are located at the north side of the lock chamber. There are two sets of five valves; one set is at the east end and the other set is at the west or Gulf end (Figure 9). The valves operated as vertically sliding gates; they were raised and lowered. They allowed water to flow through them or they dammed the chamber. The valve gates are attached to a valve stem. This stem is threaded through a revolving nut. The nut and the motor which turns it are placed on the top of the gates. Each sluice valve has its own motor; these could be manually operated when necessary. The electric motors which operated the valves were wired for 440 volts of electricity; there was no way to adjust the speed on the sluice valves.

Roller Gates

The gate itself was activated by a cantilever arm (Figure 10). This arm was worked by a bull gear and a reduction gear assembly housed in a chamber within the section of concrete lock wall. The cantilever arm is attached at the top of the gate; it pushed the gate to the bottom of the chamber. The gate moved downward through recesses in the sides of the lock wall on either side (Figure 11). The gate, when in the full

VERMILION LOCK, LA.

GENERAL VIEW OF WEST LOCK

AUGUST 1, 1933



Figure 7. General view of the west lock showing concrete components (Courtesy New Orleans District, C.O.E.).

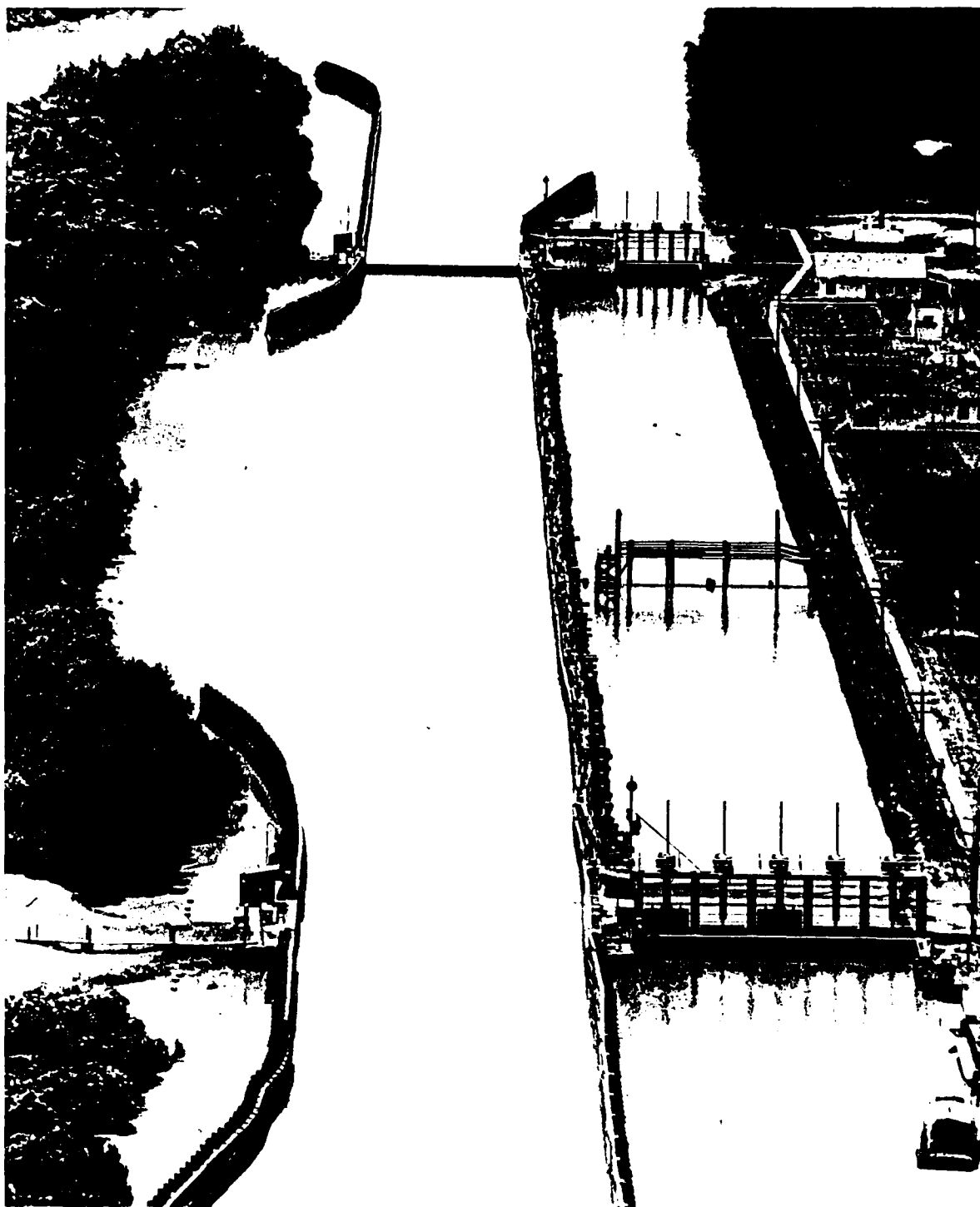


Figure 8. General view of Vermilion Lock showing fire walkway (Courtesy New Orleans District, C.O.E.).

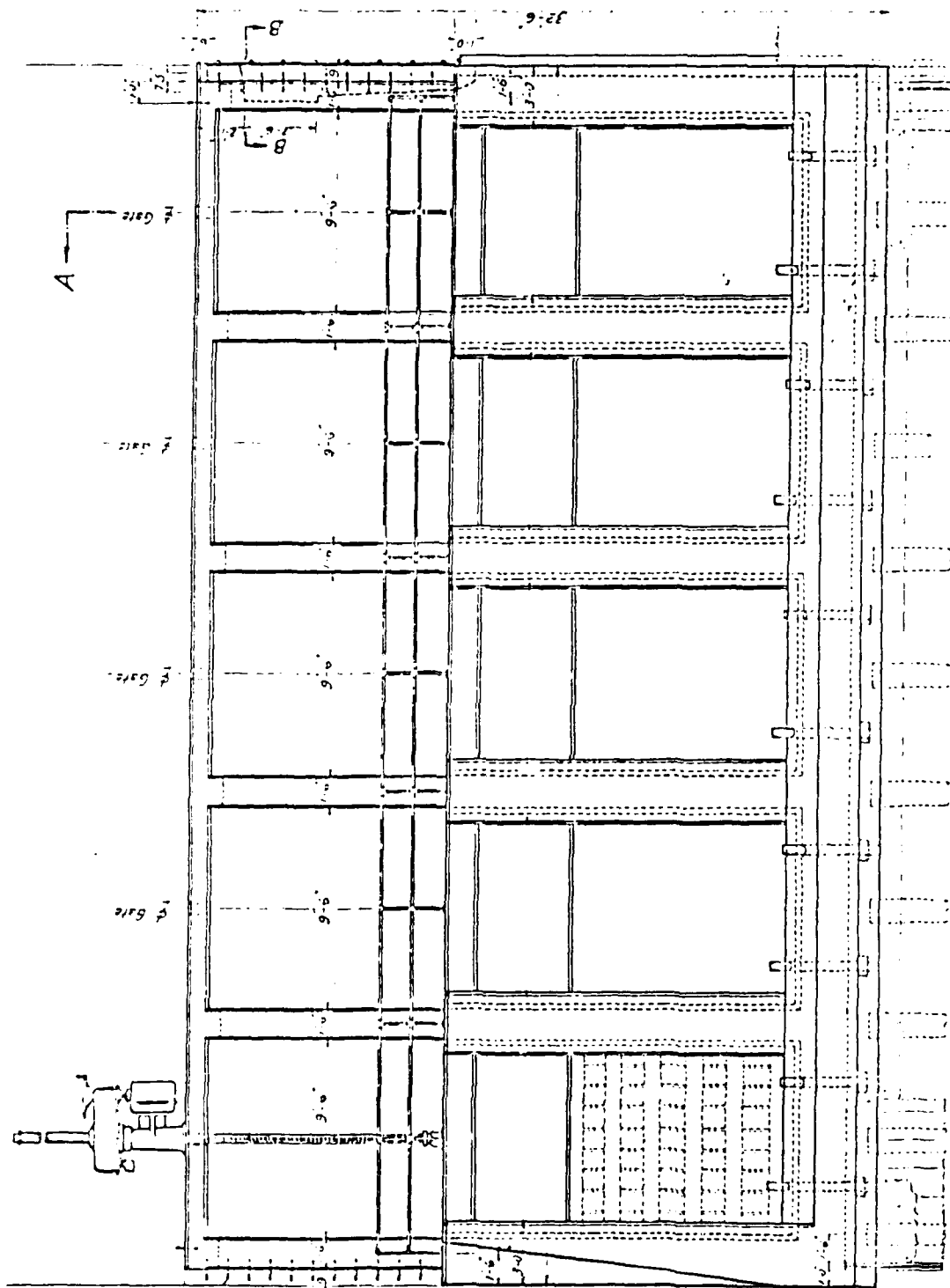


Figure 9. Elevation of sluiceways (Courtesy New Orleans District, C.O.E.).

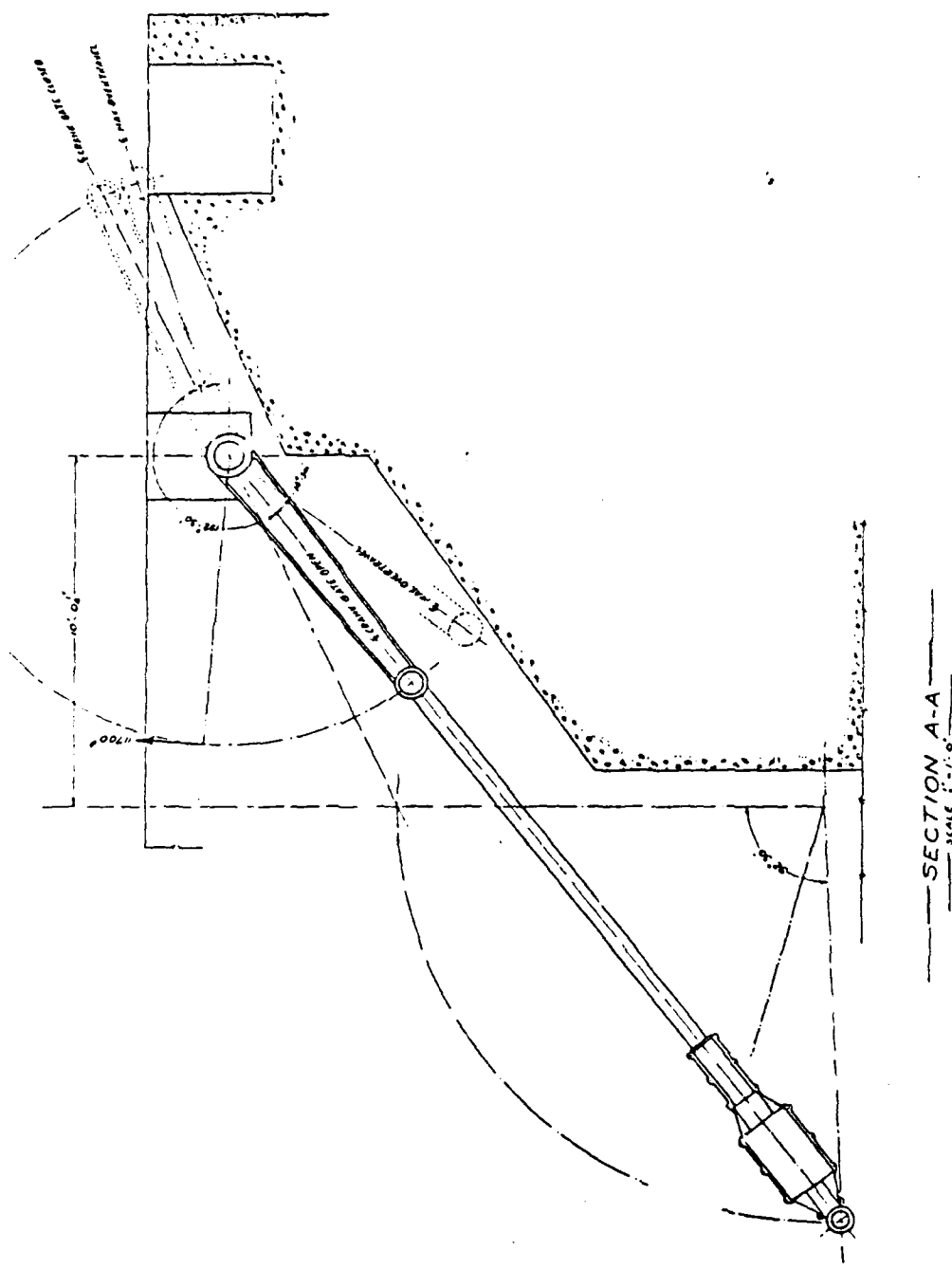


Figure 10. Cantilever gate arm system (Courtesy New Orleans District, C.O.E.).

VERMILION LOCK, LA.
EAST GATE AND SLUICeway
FROM NORTH BANK.
AUGUST 15, 1933



Figure 11. East gate and sluiceway from north bank showing gate recess (Courtesy New Orleans District, C.O.E.).

down position, lies in a recess at the bottom of the lock chamber. This ideally produced a flush condition at the bottom of the lock. The operators of the lock had to be very careful that no debris was under the gate in the recess at the bottom. In the event of debris in the recess, the gate would not fully close. The lock was equipped with marking devices attached to the gears which told the operators if in fact the gate had fallen into the full closed position (Figure 12). At the bottom of the gate, rubber seals were used to keep water from seeping through.

When the gate was raised, a mechanism was used to insure that the gate stayed in place. This mechanism may have been designed to reduce stress on the gate arm during Gulf tidal surges. Known as the wedge bolt mechanism, this system utilized a threaded rod which was moved by a revolving nut. Two arms would then push the wedge into a cavity within the gate (Figure 13). This mechanism could be operated manually when necessary due to power outages.

When flood waters threatened from the Mermentau Basin, the gates at Vermilion would be lowered and left open to drain the farmlands to the north and west. When this happened, it was difficult to raise the gates. The pressure of the flood waters often made it impossible. Tugs passing through the lock would essentially have to navigate upstream. Most accidents occurred when these strong currents were running. Large tows would get into the lock accompanied by tugs of insufficient horsepower; the current would turn the barges causing damage to either the guidewalls or the lock chamber itself (Harold Trahan, personal communication 1988). The ex-lockmaster, Mr. Trahan, commented that he had seen 30 to 40 feet of wall taken out at a time by these poorly controlled barges.

As will be described in a subsequent section of this report, the gates were often struck and damaged. In the two years Mr. Harold Trahan (personal communication 1988) served as lockmaster, 5 separate gates were replaced. When the gates were changed out, the procedure involved the use of two barges, one tug boat, and one crane. The gate was harnessed at the top as well as the bottom and was guided to the bottom of the chamber. At the bottom, divers had to work with the operators above to direct the crane operator to raise or lower either side of the gate so that the pins could be inserted into the hinges.

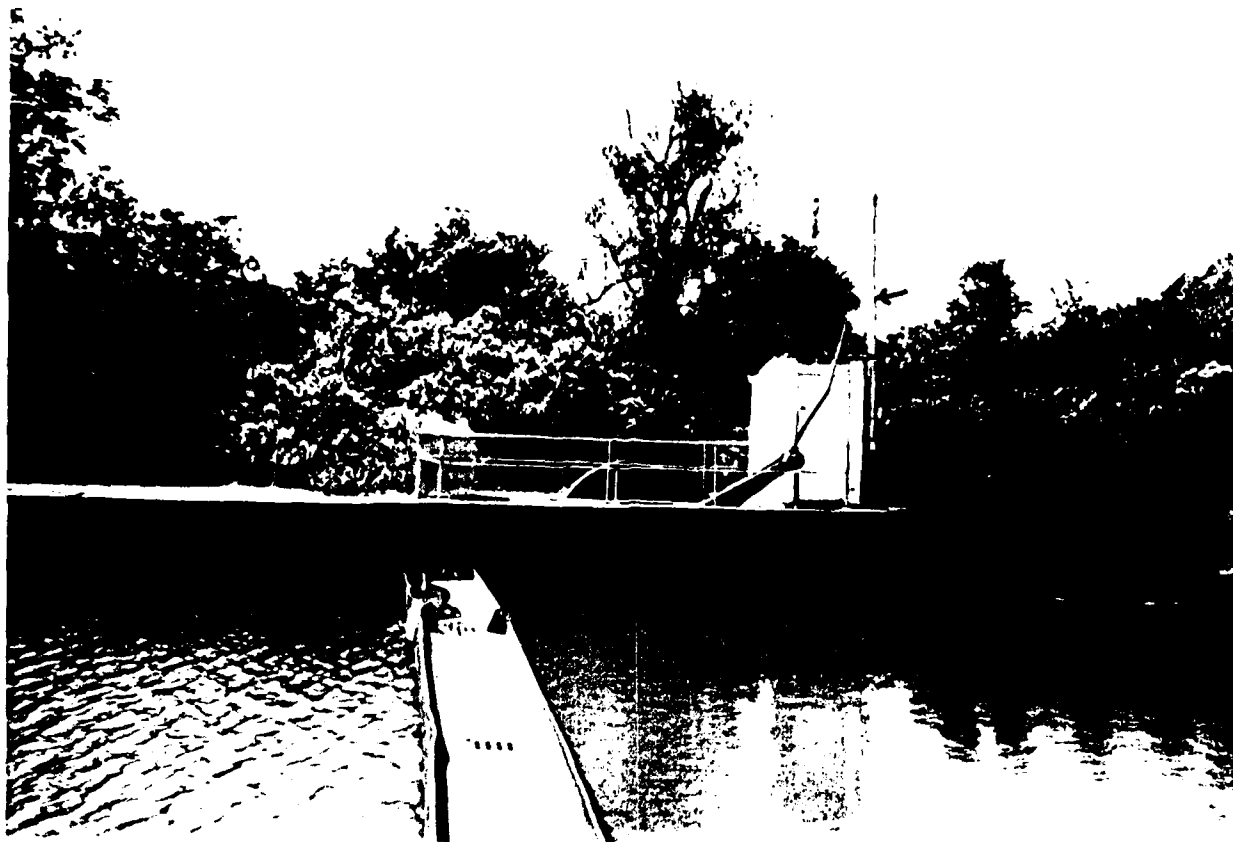


Figure 12. Marking device attached to gear mechanisms.

Guidewalls

There are four separate assemblies of guidewalls at the Vermilion Lock (Figure 14). These are designed and placed to steer barges into the lock chamber and keep them away from the concrete component edges. In addition, these guidewalls help prevent boats from running aground in the channel. By far, these structures receive the majority of the damage in the lock. The guidewalls at Vermilion are made of greenheart timber, a wood indigenous to South America. Greenheart is incredibly hard and resists the pounding from the hulls of barges and tugs. Damage to these walls is a maintenance issue, and will be described in a subsequent section of this report.

Diversion Channel

The diversion channel is located at the south side of the Vermilion complex and was used when the lock was closed for repairs. The diversion channel was mainly used when these repairs were scheduled to last for an extended period of time (i.e. three or four days). The channel was not used for shorter closings because it was difficult to remove the earthen dam within the channel. This dam was designed to be high enough to handle the differential between Basin and Gulf and thus prevent excess salt water from passing unchecked. When it became necessary to use the diversion channel, a drag line was employed to dredge out the dam and to allow traffic and water to pass. Tugs and barges using this channel were subject to rough navigating conditions because they were operating either against or with a strong current.

Mr Trahan (personal communication 1988) stated that he had heard that the diversion channel had been opened on several occasions when flooding in the Mermentau Basin was extreme. The opening of the diversion channel would, in effect, allow a greater volume of water to flow through the guard structure and speed the process of draining the rice farms and grazing pastures to the northwest. Figure 15 shows the location of this channel.

Dewatering

The Vermilion Lock was designed without an integral emergency dam. Lock emergency dams have proven to be convenient at other locks within the GIWW system during maintenance and dewatering procedures. These

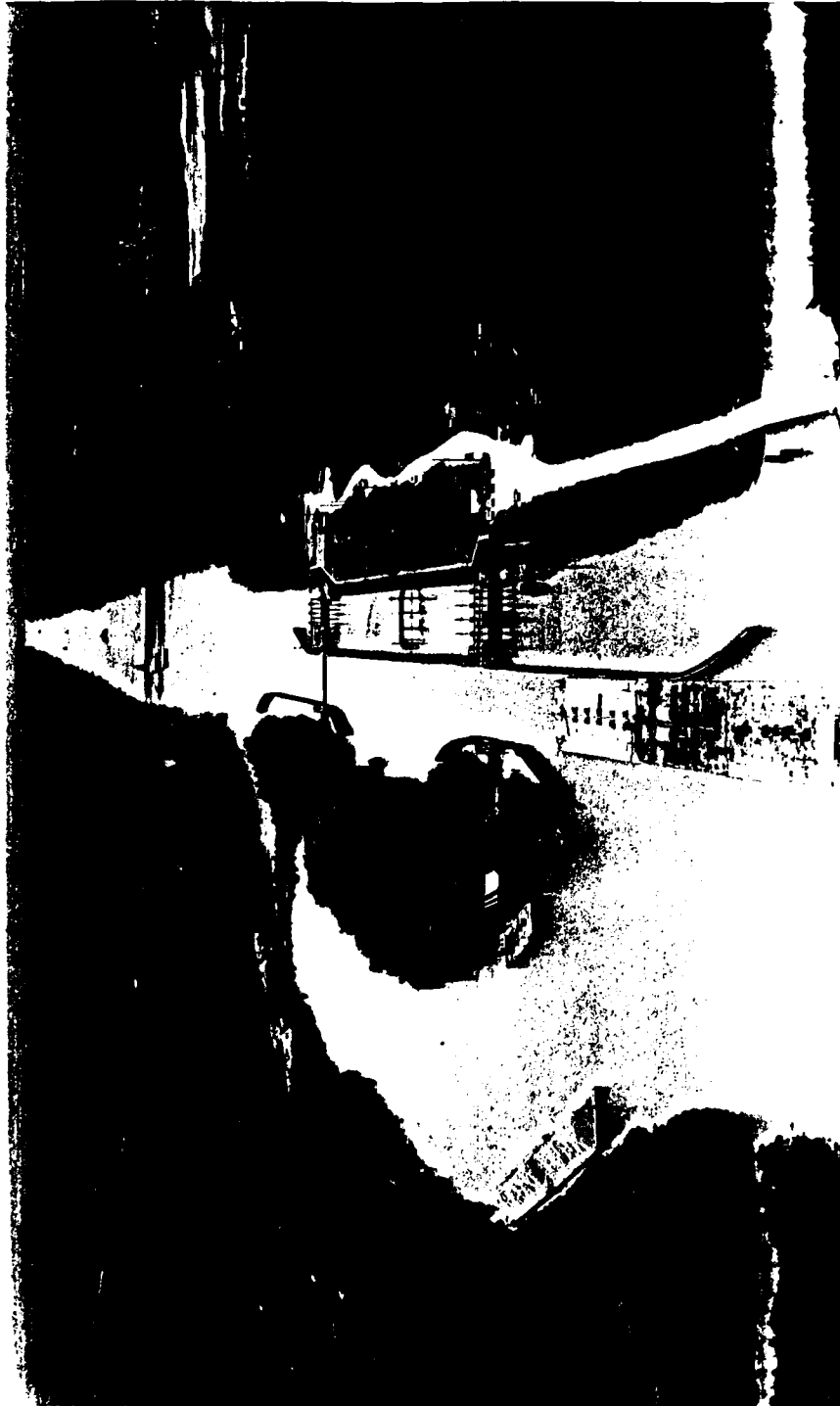


Figure 14. General view of Vermilion Lock showing guidewall structures (Courtesy New Orleans District, C.O.E.).

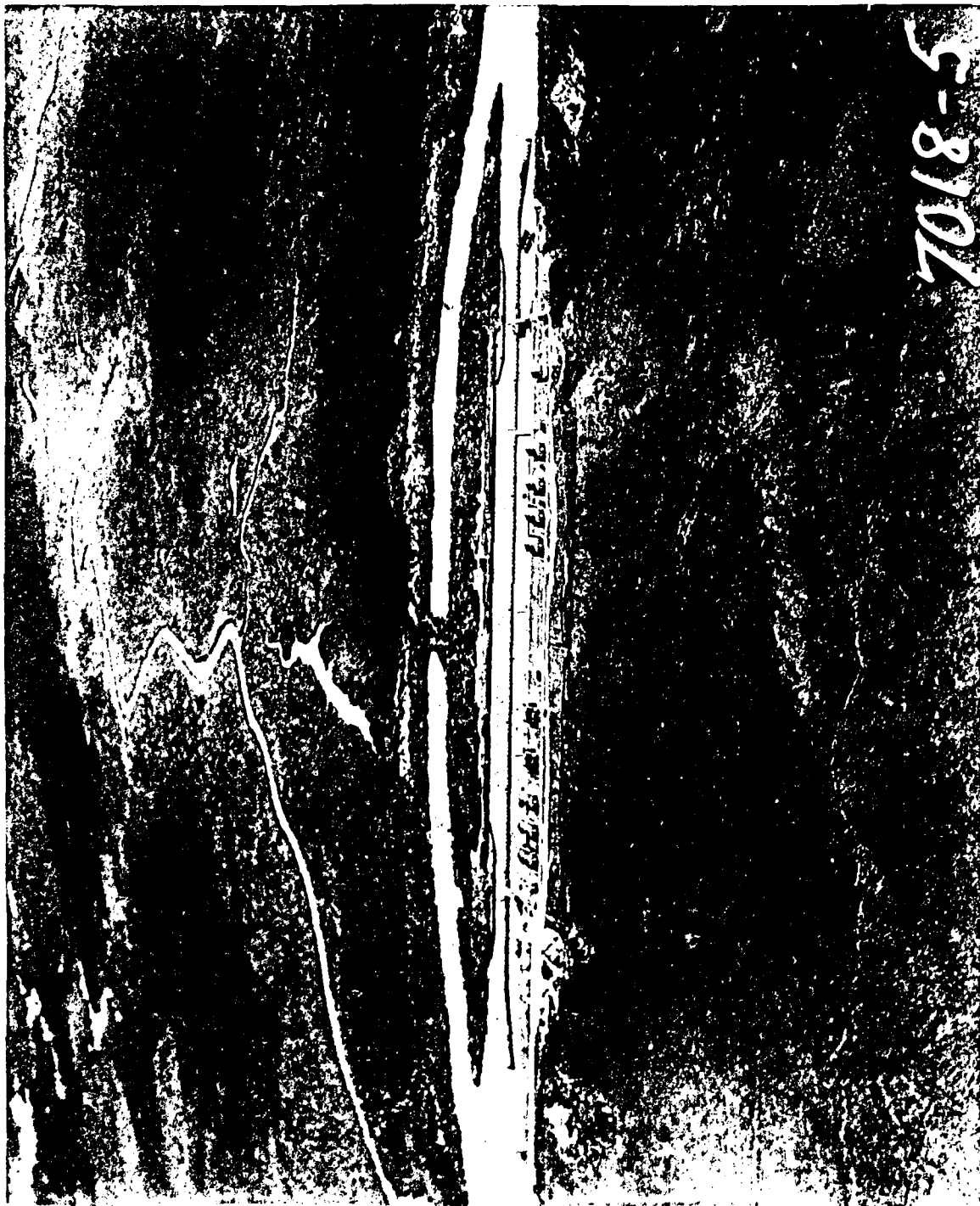


Figure 15. Aerial view of Vermillion Lock showing diversion channel at top (Courtesy New Orleans District, C.O.E.).

mechanisms provide for sealing of the lock, rapid pumping, and facilitation of repairs performed "in the dry". At Vermilion, a reasonably crude and cumbersome system was employed. In order to seal off the lock for dewatering, a system consisting of iron beams and concrete needles was used; the dimensions of the needles were 4 feet by 25 feet. These concrete needles were stored on footings which remain in the yard (Figure 16). The steel dam would be welded together and then the concrete needles were inserted and leaned against the steel; the dam was caulked with oakum. When a seal was achieved, the chamber was pumped dry. If it was necessary to do repairs totally in the dry, both sides of the lock were "needled off" (Harold Trahan, personal communication 1988).

Patching

When the lock was fully dewatered, work could be accomplished under relatively easy working conditions. However, dewatering was time consuming due to the complicated procedure necessary to install an emergency dam. This was extremely troublesome to shipping interests. The section of the GIWW in which the Vermilion Lock is located is the most heavily trafficked section in the entire system. As a result, dewatering was not always practical. Most repairs were done by divers who worked blind in the murky waters of the channel. Patching was accomplished using a special mix of underwater concrete which was mixed on the lock wall and sent to the diver via a long PVC pipe. At the bottom of the lock, the diver would work the concrete into the areas in need of repair and trowel them smooth. Patching was done on areas of wall damaged by ships as well as in areas near the hinges of the gates at the bottom (Harold Trahan, personal communication 1988).

Locking

Because of the frequent shutdowns of the Vermilion Lock resulting from maintenance activities or tidal intrusion, radio communication played an important role in the procedure of locking traffic through the facility. Radio contact with each boat was made far in advance of reaching the lock. The captain of the tug would provide the lockmaster or operator of the lock with information specific to the direction of passage, the number of barges in tow, and the commodity and tonnage of the contents. The captain was told to wait until the lock was ready. Several signaling mechanisms were employed once the boats were within visual distance of the lock chamber. These mechanisms included a pair of signal



Figure 16. Footings which supported concrete needles for emergency dam (Courtesy New Orleans District, C.O.E.).

balls which were raised to communicate to the captains of tugs. A red ball meant stop and a green ball was the signal to enter the lock chamber. At night, lights of the same colors were used in place of the balls. In addition, the lock had whistles which were used during periods of intense fog. When the boats came into the chamber, they were tied up with spring lines at the bow and stern; the lines were tied to cleats on the northern wall of the lock. This was done so that when the gates were dropped and the turbulence occurred, the boats had little, if any movement (Harold Trahan, personal communication 1988).

Once the boat and tow were moved into the lock and effectively secured, the gate of origin was raised (i.e. if the tow was heading east, the western gate was raised). When the gate was fully up the sluice valves at the opposite end of the lock were opened, allowing water to fill or leave the chamber. The gate of passage was lowered when the differential was equalized within the chamber. The tug and tows were untied and allowed to pass at this point.

CHAPTER 5

MODIFICATIONS TO THE ORIGINAL DESIGN

Introduction

Examination of original design drawings and research into maintenance at the Vermilion Lock have revealed many changes to the original structure. This section of the report addresses the issue of design integrity. All aspects of the Vermilion Lock complex which have been changed, replaced, or otherwise altered will be discussed. The reasons for all modifications to the original design will be addressed. Since it is imperative that the integrity of the lock with regard to its original design be made clear, this chapter is very important to the determination of potential eligibility for National Register inclusion. In sum, this section may be viewed as a critical analysis of specific mechanisms and assemblies which have been changed at the Vermilion lock because of their troublesome nature.

Chamber

The chamber, for the most part, has remained intact throughout the history of the lock. The only section which underwent serious modifications was the recess in the lock wall in which the gears for the cantilever arms are located. These walls were rebuilt on several occasions, and in fact were raised in 1971 to further prevent water from entering this cavity and damaging the machinery. When this was done, the walls were jack hammered to expose the steel rebar (Figure 17). A new form was made and fresh concrete was poured on top of the existing wall. Additional modifications to the chamber were made where severe cracks developed after being struck by watercraft. A corner crack was treated with the installation of a steel framed corner. This steel corner (Figure 18) was bolted into the wall and kept the crack from further expansion and spalling.

Although the damage was not excessive, many sections of the concrete gatebays were seriously worn. Most of the corners were chipped and worn round by constant rubbing and bumping. In addition, during a 1973 dewatering, it was noticed that at least two inches of concrete had been worn away below the waterline as a result of rubbing (Hugh L. Brownlee, Chief, Operations to Mr. Breerwood, Chief, Planning Division, 20 April

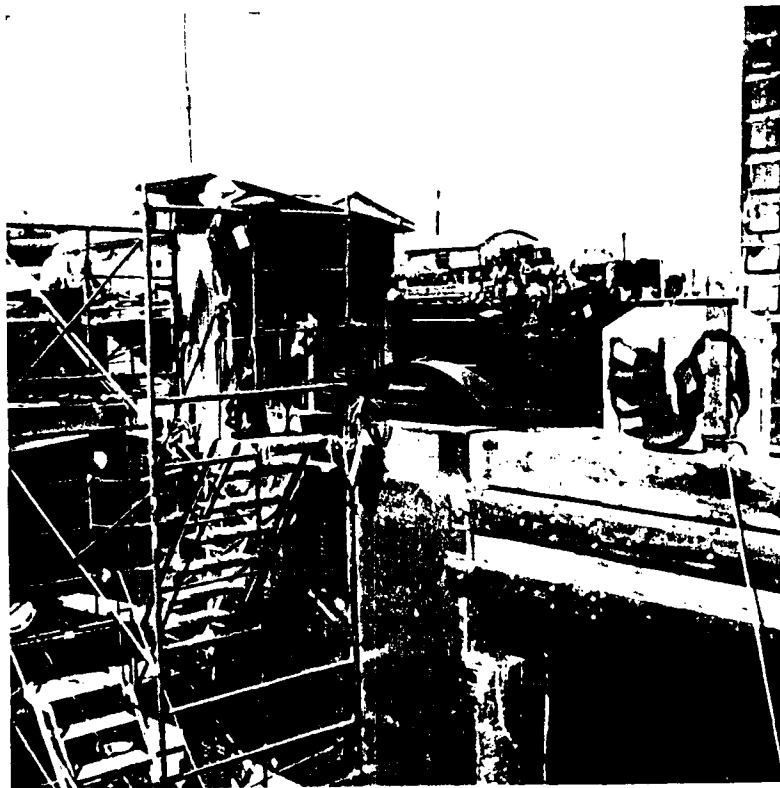
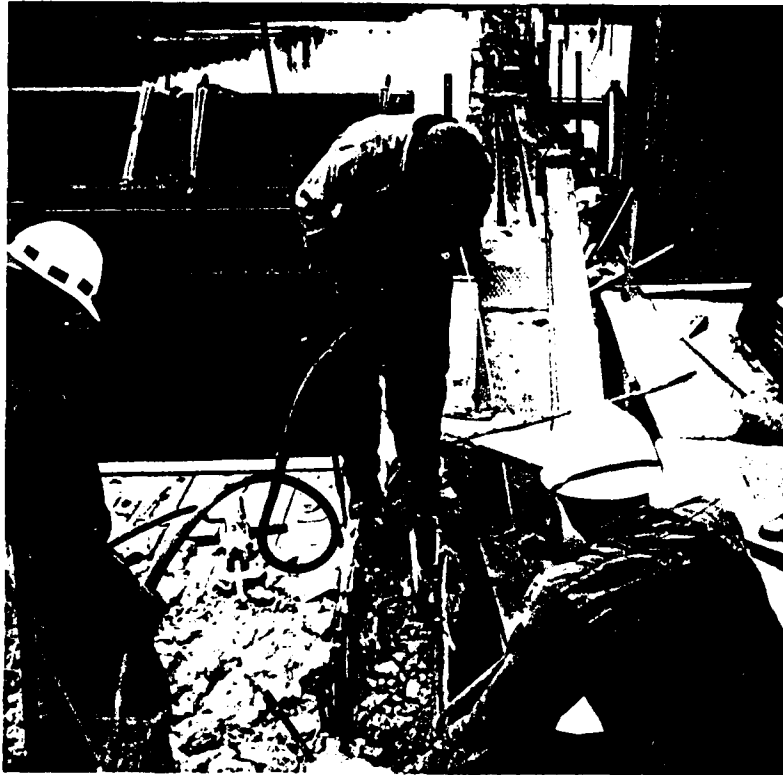


Figure 17. Jackhammering and subsequent modification to lock wall (Courtesy New Orleans District, C.O.E.).



Figure 18. Steel corner added to lock chamber
(Courtesy New Orleans District, C.O.E.).

1973).

Gates and Gate Machinery

Because the lock was built at an elevation of 6.0 feet above m.l.g., there are certain natural phenomena which cause water to rise above the walls of the lock (Figure 19). During hurricanes, storm surges push water from the Gulf of Mexico into the Mermentau River Basin. The Vermilion Lock was an ineffective guard against salt water intrusion during these periods. In addition to threatening rice farming to the north and west with salt water, stages which overtopped the lock walls also imperiled the gate operating machinery. When the Vermilion Lock was designed and constructed, the gate operating motors were in the bottom of the gate arm recess (discussed above). When salt water reached elevations even with or above the lock's walls, these chambers would flood and damage the motors; some machinery had to be replaced (Harold Trahan, personal communication 1988). As a result, these motors were eventually moved to a location on top of the walls where they were enclosed in corrugated metal sheds (Figure 20). Chains were then attached between the motors and the gears and functioned as drive mechanisms.

Sluice Valves

When the lock closed for operations in 1985, there were only a few sluice valves which were still in operational condition (Harold Trahan, personal communication 1988). As the lock was used, the guides became worn. A rapid current would kick the valve gate out of position. When there were fewer than ten sluice valves operating, it took longer to fill or drain the chamber. This resulted in further delays to shipping. At some point in 1976, new sluice valve gates were ordered and received on the site. These gates proved to be 8 inches narrower than the existing components. As a result, some of the sluice frames were modified by adding a Z frame to each side. The addition of these Z frames allowed the new, smaller valve gates to be used through the modification of the original assembly (Mario Slavich to Chief, Maintenance Branch, 6 August 1976).

Structures

The lock operator's structure, located at the west end of the lock, originally housed the electrical generator for the lock's machinery

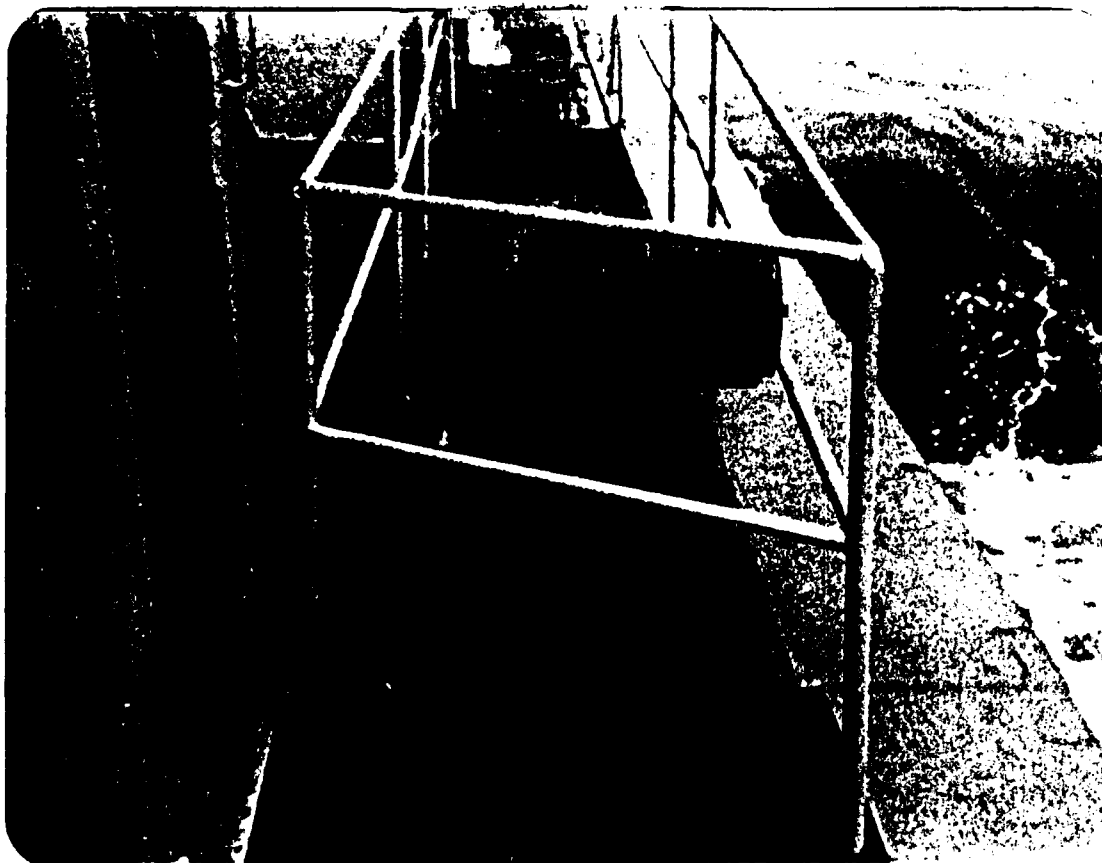


Figure 19. Flooded gate arm recess (Courtesy New Orleans District, C.O.E.).

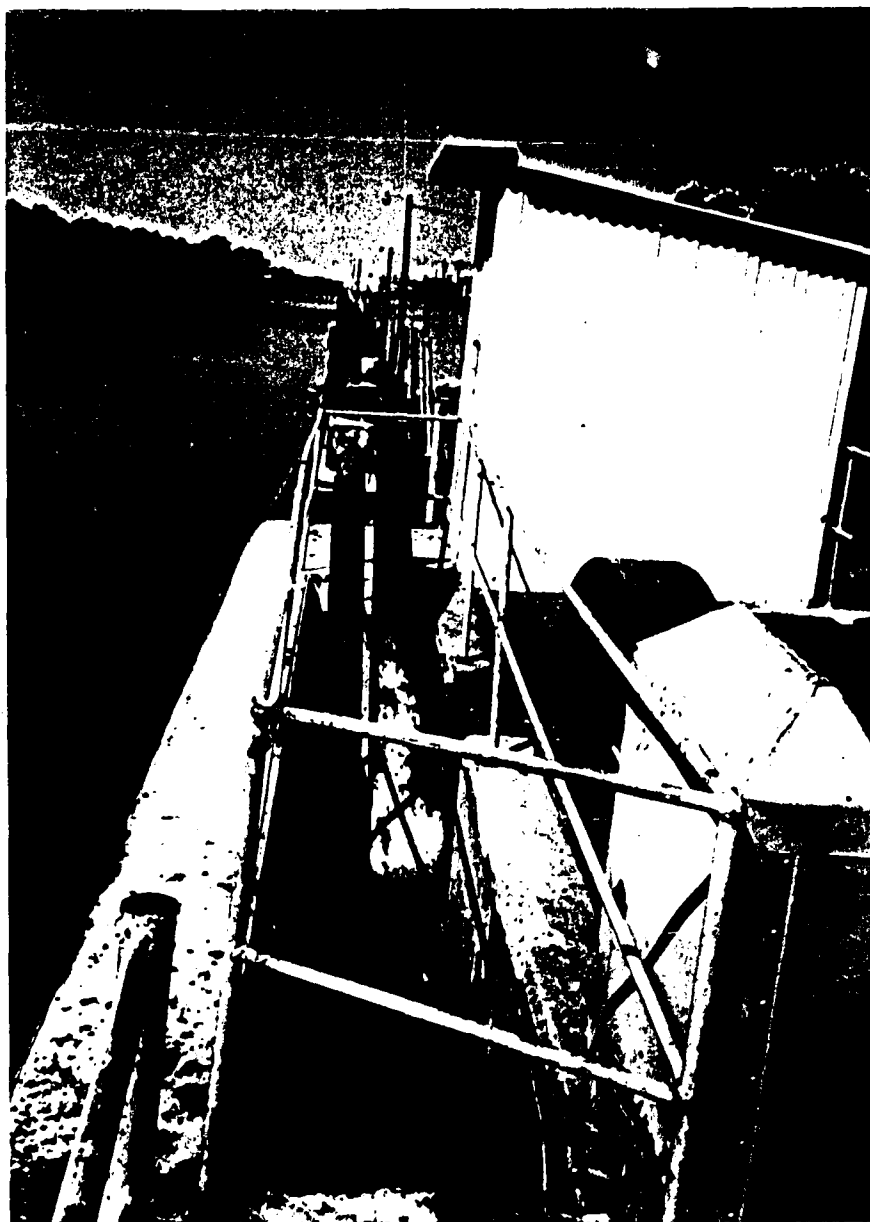


Figure 20. Added metal sheds enclosing gate machinery.

(Figure 21). The lock operator would work beside this machine. This arrangement proved to be a problem since the generator was very loud and interfered with the lock operator's task performance. Subsequently, the generator was moved into a new building on the northern bank of the lock. The structure in which it was located does not appear on original plans of the complex. This generator has been relocated to the Berwick Lock (Harold Trahan, personal communication 1988).

Many of the original buildings which were designed and built on the northern shore of the Vermilion Lock have since been demolished. Original plans show a total of 12 structures located along this bank (photographs verify this); 7 remain today. All were simple wood frame dwellings with the exception of several poured-in-place concrete structures. These structures will be thoroughly assessed in Appendix I of this report.

Conclusions

Problems associated with the original design as described in the previous chapter of this report resulted in many of the modifications to the Vermilion Lock. As the lock got older and more heavily utilized, more repairs were required. The entire complex underwent extensive electrical modifications during the mid-seventies (Harold Trahan, personal communication 1988). The integrity of the original design was severely altered in several places to facilitate continued operation of the structure. In the words of Hugh L. Brownlee, Chief, Operations Division:

Vermilion Lock is an old structure which has been excessively damaged, worn, and worked. Many components have been repaired, replaced, and/or reworked. As a result, the lock does not mechanically operate as designed. Maintenance problems continue to accelerate (Hugh L. Brownlee to Mr. Breerwood, Chief, Planning Division, 20 April 1973).

Examination of both maintenance and correspondence records as well as a physical examination of the lock have revealed a highly altered original structure and site complex. As designed, the lock had many



Figure 21. Original electrical generator in lock operator's structure (Courtesy New Orleans District, C.O.E.).

problems. These were combatted by frequent repairs, replacements, and new solutions which were in no way part of the original scheme. Therefore the integrity of structure, design, and materials have been sacrificed so that the lock could continue to function.

CHAPTER 6

MAINTENANCE

Introduction

This chapter focuses on the procedures that were necessary to keep the Vermilion lock operational. Many of the problems associated with maintenance stem from an inadequately designed and overworked facility. The Corps of Engineers spent a great deal of time and money repairing the lock to keep the waterway open. Standard procedures, substantial operations, as well as infrequent occurrences will be discussed below. This chapter is considered very important to this National Register assessment. Some of the maintenance activities described below were executed in such a way that they modified the original structure; others kept original components in operational condition.

Chamber

In addition to collisions, the concrete lock chamber experienced periodic damage resulting from marine traffic rubbing against the side. It was often necessary to patch sections of the wall cracked by ships. Depending upon the severity, repairs were done either in the wet or in the dry. When the lock was severely damaged, the chamber was "needled off" and the lock was pumped dry. Repair crews entered and began procedures to remedy the situation at hand. Certain areas only needed patching. Other maladies were bad enough to warrant spanning the crack with a steel plate to prevent further spalling or exposure of reinforcing material.

Sheet metal was installed on the wall of the lock chamber adjacent to the gate arm recesses. This was added to reduce friction and to protect the rather thin concrete section at the gate arm recess section of the chamber wall. These 3/4" steel plates were worn by the constant rubbing of watercraft. In fact, Mr. Trahan (personal communication 1988) observed that over a period of two months, these plates could be reduced to a thickness of 1/4"; they were periodically replaced (Figure 22). The worn plates were unbolted and new plates were mounted. This section of the wall experienced a great deal of flexure (mild bending of the reinforcing steel). If compressed too far, the gate arm would rub on the inside of the

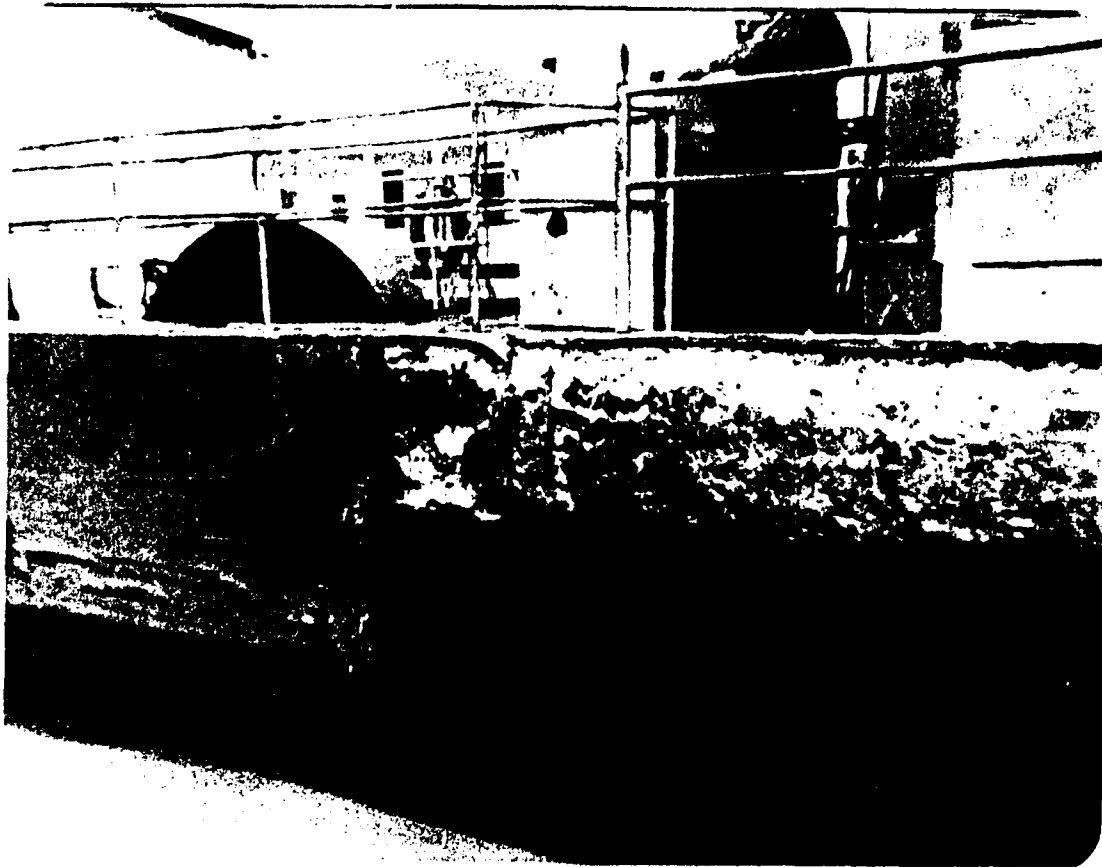


Figure 22. Damaged sheet metal plates (Courtesy New Orleans District, C.O.E.).

wall. Jacking the wall was often necessary to insure smooth operation of the arm.

Another routine maintenance procedure was to pump the recesses and the pits in the lock chamber dry. The gate recess would collect water from seepage and rain, and if left unchecked this water could break down the oil in the gear housings. If a tide from the Gulf overtopped the gates, the casings would invariably have to be replaced (Harold Trahan, personal communication 1988). These recesses were kept dry, and thus, the machinery safe by means of a sump pump. This pump also drained pits in the lock chamber which go down the side and across the bottom of the locks. Again, water would get into these pits by seeping through hairline cracks in the chamber or simply during rainstorms (Harold Trahan, personal communication 1988).

Gates and Gate Machinery

Although it may be considered a design modification, the replacement of gates became so commonplace that it should be treated as a maintenance function. Mr. Harold Trahan (personal communication 1988) stated that during his 2 year tenure as lockmaster at Vermilion, 5 separate gates were changed:

When I was here, we changed the gates five times. You need divers, mobile cranes and a tug. The first time it was ever done it took us two weeks; the last time we did it, it took us one day to take it out and one day to replace it. You become proficient when you have to do something very often. The reason that it takes so long is that the divers can't see what they are doing; it is hard to put the pins back in at the bottom of the gate (Harold Trahan, personal communication 1988).

The hinges at the bottom of the gates (Figure 23) were often worked out of alignment by a combination of the action of the gates and the forces of the currents pushing against them. At times, these gates would work loose from their hinges and have to be repinned. A diver would go



Figure 23. Hinges at the bottoms of the gates
(Courtesy New Orleans District, C.O.E.).

to the bottom of the chamber while the gate was harnessed and adjusted into position by a crane; the pins would then be inserted. In addition, it was routine maintenance to have a diver tighten the nuts connecting the hinges to the concrete sill of the lock. This operation was carried out on an average of once every two weeks (Harold Trahan, personal communication 1988).

As noted above, the spring mechanism at the end of the gate arm was ineffective in reducing shocks to the cantilever arm (Figure 24). When the gate was struck with any degree of severity, the arm was damaged as well as was the spring mechanism (Figure 25). Receipts of payment for these parts abound in the New Orleans District's records of activity at Vermilion.

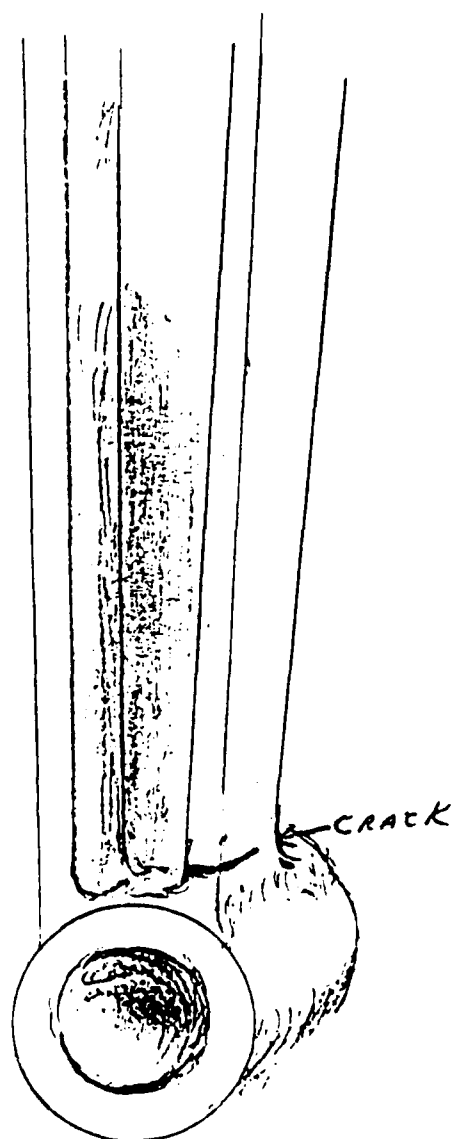
Sluice Gates

The constant friction between the sluice gates and the guides caused occasional problems at Vermilion. When the guides were worn thin enough, a strong current would turn the valve gates and kick them out of track (Figure 26). Near the end of the functional life of the Vermilion Lock, damaged sluice valve gates were ignored; repairs were seen as too expensive to justify:

Operations division does not plan to replace any sluice valves in the near future. The sluice valves are in adequate operating condition at the present time, (with a few noted exceptions)... it is felt that it is not economically feasible to expend funds on an old facility that will be replaced in the near future (Nettles to Chief, Engineering Division, 6 January 1978).

Wing Walls

The wing walls received the brunt of the damage to the lock. They were the first point of contact for marine traffic. As was previously discussed, the lock was sometimes operated with both gates in the down position to drain flood waters out of the Mermentau Basin. When low powered tugs pushed large barges through the rapid current, navigation was difficult. The horizontal members are made of greenheart timber.



CRACK did not go
through. The crack
is where shown only.

A.S.

Figure 24. Drawing of damaged arm section (C.O.E.
Vermilion Files, F.Y. 74-75).

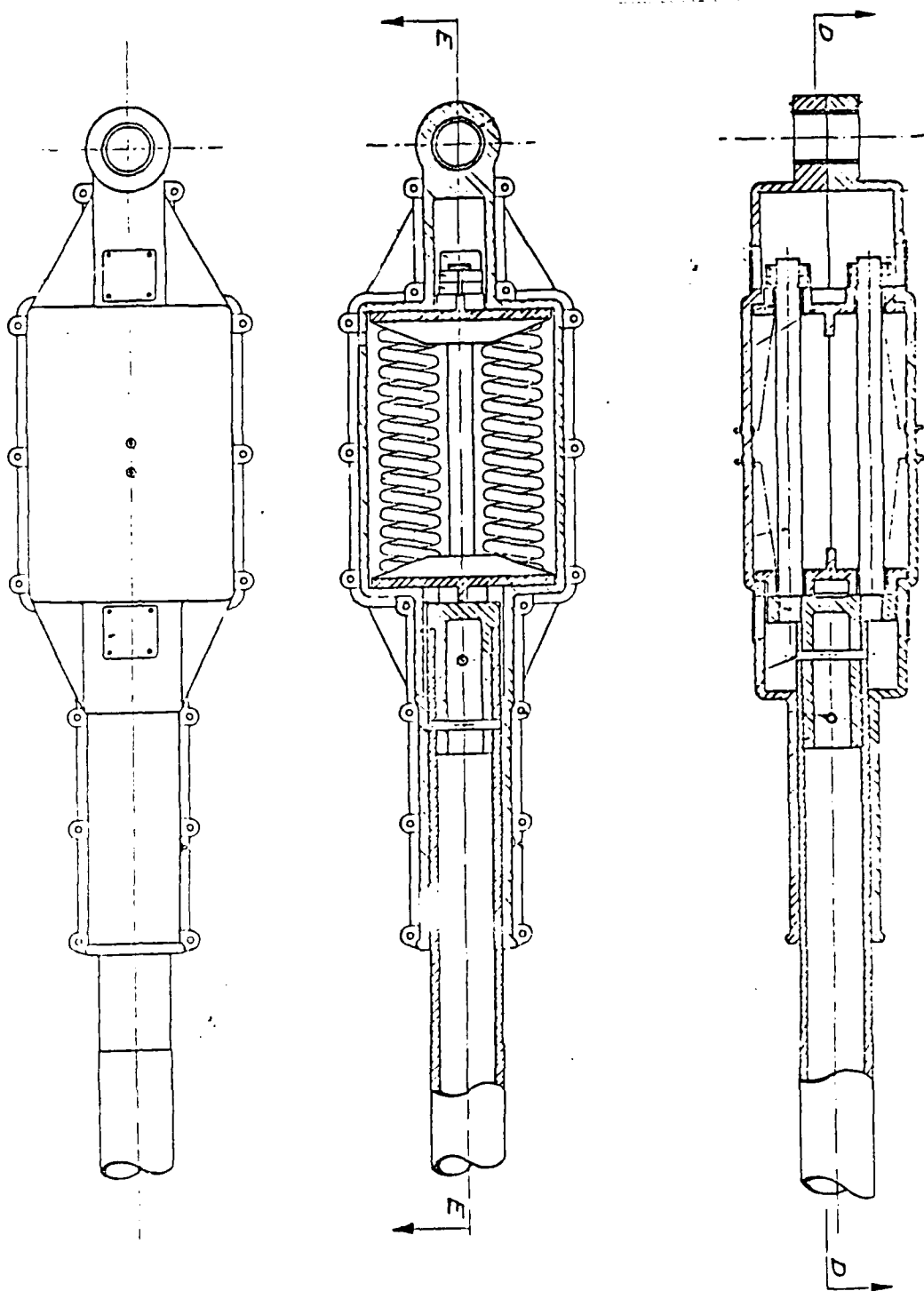


Figure 25. Shock absorbing spring mechanism
(Courtesy New Orleans District, C.O.E.).



Figure 26. Askew valve gate at Vermilion Lock.

This wood is very hard and can withstand a great deal of rubbing; but not collisions:

They eat us up hard on the wing walls.
When I got here, the west wing was 200 feet long. In a period of two months, that was reduced to 30 feet. We had tremendous marine accidents here; they'd take down 70 to 100 feet of wall at a time (Harold Trahan, personal communication 1988)

Not only were walls removed by barges and tugs, the constant slamming also resulted in the weakening of the pilings that support these walls. Continuous repair and replacement was necessary at the wing and guide walls since these protected the concrete sections of the lock and the machinery housed within them.

Conclusions

The Vermilion lock required constant attention as well as critically careful lock operation to remain operational. The expensive maintenance was a function of some unfortunate design decisions combined with the heavy volume of traffic that traversed the lock. While one of the most important functions of the lock was to provide for safe and swift passage for tows using this section of the GIWW, this was hardly the case. Many of the maintenance operations required lock shutdown. This could last several hours or several days. This was an additional inconvenience to marine traffic added to other delays at the lock attributed to natural phenomenon. The New Orleans District Corps of Engineers realized that the lock needed replacement and undertook action beginning in 1965 to build a replacement lock. These projects take time. In the interim, the Corps expended considerable funds to keep Vermilion open to traffic:

The lock was dewatered in 1971 and major repairs were performed at a cost of \$109,000. The work consisted of replacing the west end gate with a new gate, necessary painting, miscellaneous concrete

and steel work, and refurbishing all pins and bushings....Over the last three years, the average annual cost for routine maintenance was \$102,000. The lock was last inspected in November of 1977 and found to be in safe, stable condition (C.J. Nettles, Chief, Operations to Mr. Jewitt P. Hulin, Vermilion Parish Police Jury, 2 May 1978).

Maintenance costs for the years 1955-1964 are presented in Table 2.

<u>Fiscal year</u>	<u>Lock operation</u>	<u>Lock maintenance</u>	<u>Total</u>
1955	\$ 81,500	\$ 37,500	\$119,000
1956	84,900	13,900	98,800
1957	93,200	None	93,200
1958	93,500	32,700	126,200
1959	103,500	112,500*	216,000
1960	106,100	25,700	131,800
1961	117,700	26,700	144,400
1962	105,200	69,400	174,600
1963	123,000	43,400	166,400
1964	118,900	136,900**	255,800
Average (annual)	\$102,800	\$ 49,900	\$152,700

*Unwatering and major repairs, \$71,000; new gate, \$10,100; fender repairs, \$19,000; reimbursable damages, \$12,400.

**Steel sheet piling, \$47,200; fender repairs, \$35,300; replace valve stems, \$13,300; other repairs, \$31,200; reimbursable damages, \$9,900.

Table 2. Maintenance Costs for the Years 1955-1964 (New Orleans District, C.O.E. 1965).

CHAPTER 7

SHIPPING

Introduction

The following discussion centers on the role the Vermilion Lock played in the shipment of commodities along the GIWW. The lock was designed to handle certain size vessels and maximum amounts of tonnage. This section will describe these parameters and will present information demonstrating the events that occurred when these limits were exceeded. The entire GIWW system was effected by the presence of the Vermilion Lock complex; it became the limiting structure along the waterway because of its size and depth above sill. Further, this chapter will discuss hazards and inconveniences to the shipping industry resulting from the design of the lock and its natural environment.

Volume

The Vermilion lock was one of the most heavily traveled locks in the New Orleans District. In fact, the lock ranked second among all district locks in the amount of tonnage passed (Brownlee to Breerwood, 20 April 1973). Studies of trends in the shipping of petrochemical products and other commodities were conducted in the mid-sixties. It was determined that the traffic on the section of the GIWW between the Sabine and Atchafalaya Rivers might grow by about 250 percent by the year 2000. A tonnage projection was made by the New Orleans District in 1963. In that year, the Vermilion Lock handled 26,674,000 tons of commodities. The study estimated that by the year 2018, the lock could be handling 60,000,000 tons annually; far beyond the established practical capacity of 25,900,000 tons annually. By 1965, this capacity had been exceeded (Table 3). In 1978, 41,951,268 tons of traffic passed through the lock (Lower Mississippi Valley Division, C.O.E. 1981). Obviously, the number of tons exceeding the practical capacity directly related to delays for marine traffic.

<u>Year</u>	<u>Tonnage</u>
1954	13,036,000
1955	14,646,000
1956	16,948,000
1957	19,159,000
1958	17,965,000
1959	18,855,000
1960	19,236,000
1961	21,225,000
1962	21,542,000
1963	26,674,000
10-year average	- 18,929,000 tons

Table 3. Tonnage in the Vermilion Lock, 1954-1963 (New Orleans District, C.O.E. 1965).

Delays

The Vermilion Lock received a heavy volume of traffic resulting from its location in the most industrialized section of the GIWW. Anywhere from 30 to 35 tugs per shift were run through the facility (Harold Trahan, personal communication 1988). According to Mr. Trahan, there were always 10 to 15 tugs waiting to be locked through. As a result, the speed of the tows approaching the lock had to be reduced. Tugs would radio the lock far in advance to determine the extent of traffic conditions. During certain maintenance-related closures, the delays were extensive. The tows would have to stop and tie up in the GIWW or take an alternate route. Another cause of delays was the return time of the lock; the physical operation procedure of the lock was very time consuming. Two separate mechanisms (sluice valves and gates) had to be operated for each locking. If there was a large differential, the wait was longer since it took more time to fill the chamber. This problem was heightened towards the end of the lock's effective life when many of the sluice valves were non-operational. Conditions at the lock were hectic; the operators worked very hard. As former lockmaster Harold Trahan recalled:

There was no way to speed traffic along because of the combination of the current and the narrow lock chamber. If we shut down for 4 to 6 hours, we would back up 15 to 20 boats. You couldn't just drop the gates and let them run (Harold Trahan, personal communication 1988).

When the gates were opened to let the flood waters drain out of the Mermentau Basin, costly delays to shipping were commonplace. The New Orleans District noted in its report Replacement of the Vermilion Lock:

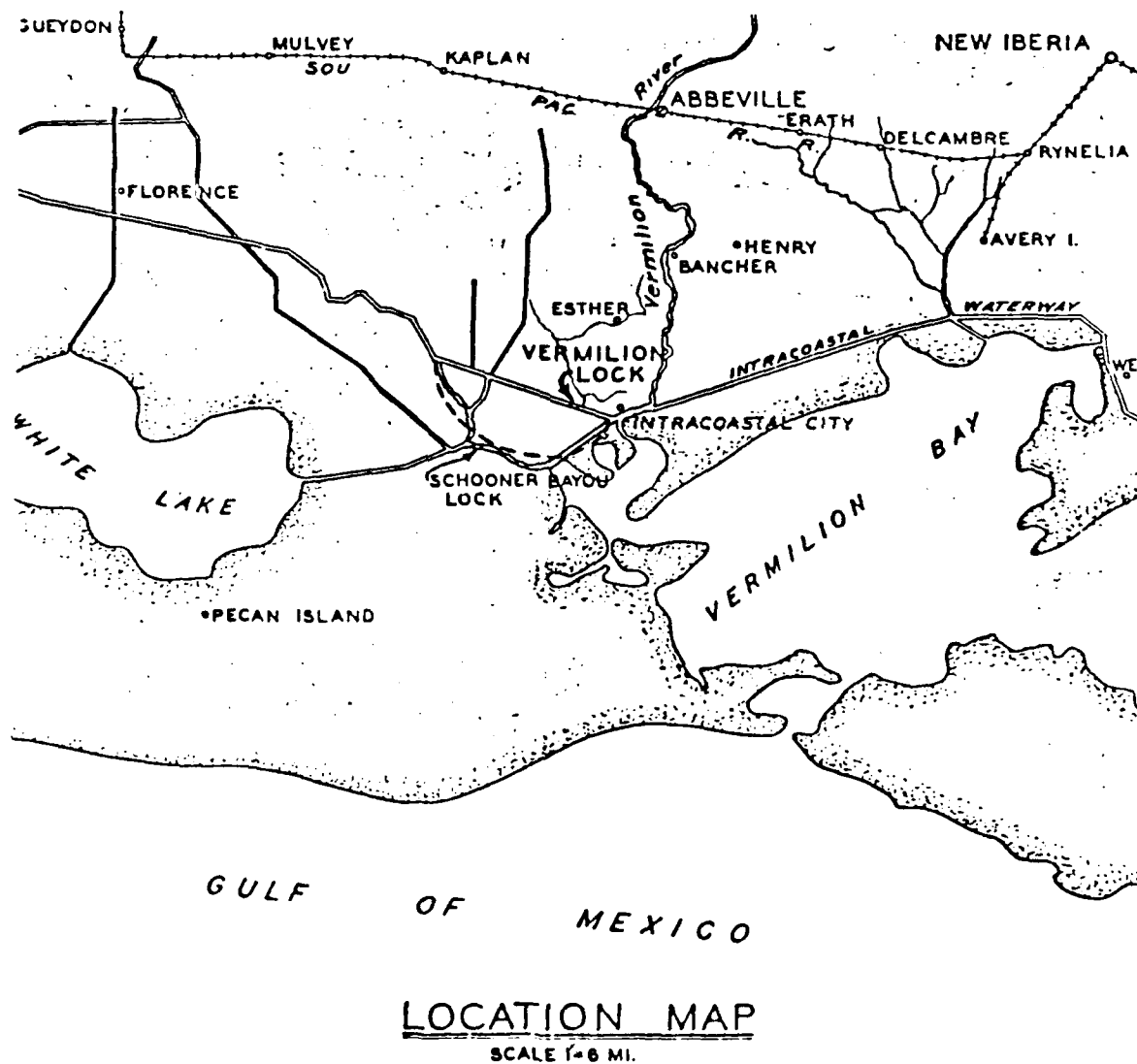
During a typical period when the lock gates were opened to emit flood waters (2-14 July 1964), 18 tows were delayed a total of 38 hours. Every westbound tow except one required the assistance of an additional tugboat to pass through the lock. The average hourly cost of delay was \$65.80 which consists of \$36.20 per hour for the tow and \$29.60 for the assisting tug. The estimated annual cost of delays is \$10,000 (New Orleans District, C.O.E. 1965:23).

In order to move greater volumes of commodities through the GIWW, the practice of arranging tows in tandem configurations became standard. The narrow width of the Vermilion Lock (56 feet) did not allow tandem tows to pass in one lockage. Therefore, tows would have to be broken and taken through in several trips by the tug. This practice is known as "tripping." In addition, overwidth tows were, on occasion, granted special permits to move through the GIWW. The maximum length of a tow on the GIWW is 1180 feet and the maximum width is 75 feet; a permit is required for anything larger. These larger tows would carry specialty equipment such as barges, derricks, or pieces of drilling platforms that were being relocated. When tow widths exceeded 55 feet, the Vermilion facility could not be used. Instead, other routes had to be taken. One such route was the Schooner Bayou section of the waterway (Figure 27). While the width of this facility is 75 feet, the navigable depth is only 9 feet below m.l.g. Mr. Trahan (personal communication 1988) stated that 50 to 60 per cent of the traffic normally passing through Vermilion could navigate Schooner Bayou. Many other vessels were restricted because of the low clearance elevation. Another alternative was to move the craft in the open waters of the Gulf of Mexico. This was a periodically dangerous practice that subjected vessels to tidal surges and squalls.

Conditions in the Lock

While certain conditions held, movement through the lock was extremely dangerous for marine traffic. If the current was strong from the Mermentau Basin, tows often could not make headway. This problem was amplified by the fact that many of the tows were propelled by tugs with inadequate horsepower (Harold Trahan, personal communication 1988). The ability to traverse the lock was a function of both the power of the tug and the draft of the barges making up the tow. Tugs and barges in excess of 26 feet in width and drawing 8.5 feet of water had difficulties passing through the lock unless they had a lot of horsepower; if not, they would have to be assisted by other vessels. Fast currents and meandering tows increased the potential for damage at Vermilion Lock. Another phenomenon that caused difficulties at the lock was a large differential. For instance, when the Gulf level was low due to seasonal fluctuations, the water level on the outside would drop even further when the sluice gates were opened inside the chamber. This phenomenon is known as drawdown. Traffic could not navigate and "You couldn't get enough

Figure 27. Schooner Bayou diversion (Courtesy New Orleans District, C.O.E.).



water into the lock. It was like trying to fill a big hole with a little pipe" (Harold Trahan, personal communication 1988).

Impact on GIWW

The GIWW connects estuarine waterbodies and navigation arteries across the Gulf Coast from the Mexican border to Apalachicola, Florida (Figure 28). Nine locks are part of the Louisiana section of the waterway. These connect tidal bodies to inland bodies, provide salt water protection and flood relief.

When Vermilion Lock was completed in 1933, the dimensions of the GIWW were 9 x 100 feet. Ten years after the completion of the lock, the waterway was expanded to 12 x 125 feet. Within ten years of completion, the depth of the GIWW had exceeded that of the sill at the Vermilion Lock. Further waterway enlargements to 16 x 200 feet for that section between the Atchafalaya and Sabine Rivers, and to 16 x 150 feet for that section between the Atchafalaya and Mississippi Rivers was approved by the Rivers and Harbors Act of 1962. This further outdated the Vermilion facility. When the lock was shut down to marine traffic in 1985, Vermilion was the controlling structure in the GIWW for both width and depth. Its location west of the Atchafalaya and east of the Sabine Rivers is an integral part of the GIWW.

There are no locks or floodgates in the GIWW between the Calcasieu River and the Houston Ship Channel. Marine traffic drops off significantly in this region.

The GIWW's efficiency is a function of its smallest component. In a letter to Mr. Breerwood, Hugh L. Brownlee, the Chief of Operations Division at the New Orleans District commented:

The existing Vermilion lock is too narrow, shallow, and low to adequately handle present navigation demands, much less future demands. Present structure dimensions make Vermilion Lock, in effect, a bottleneck on the Gulf Intracoastal Waterway, and as a result, has caused untimely and untold delays. Its size has also limited the growth and efficiency of waterborne commerce necessitating use of the lock (Brownlee to Breerwood, 20 April 1973).

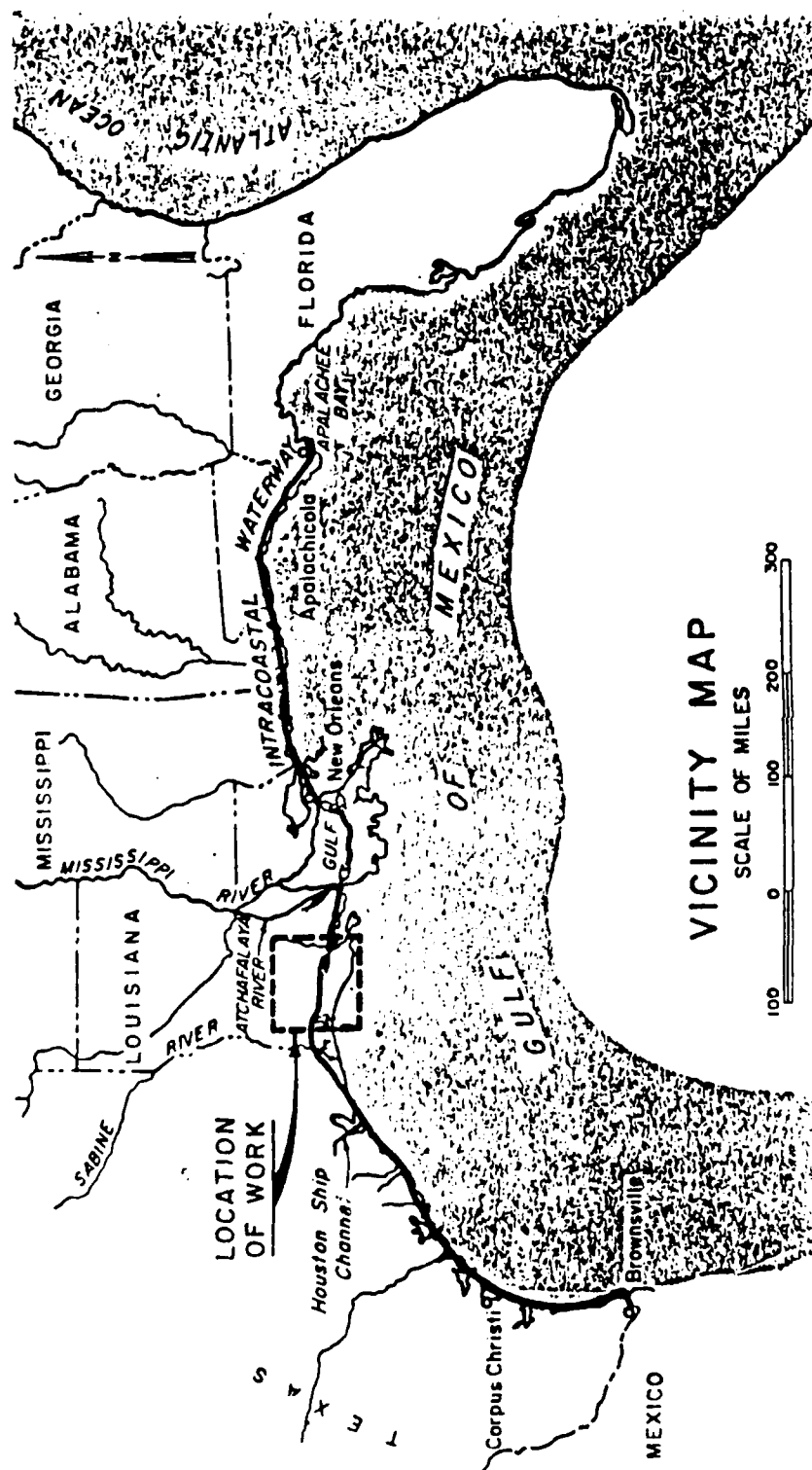


Figure 28. GIWW Waterway (New Orleans District
C.O.E. 1965).

In addition, the Vermilion Lock was one of only two locks in the GIWW in the New Orleans District which had a width of only 56 feet (Table 4). Major locks typically had been constructed with 75 foot wide chambers. Since the trend in shipping during the late 1960s and 1970s seemed to be toward tandem tows and deeper draft barges, Vermilion was indeed a problem.

Conclusions

It is clear that for years, the Vermilion Lock facility was a hindrance to the maritime interests in Southern Louisiana. In fact, the physical dimensions of the chamber (length, width, depth) served to limit the growth potential of the entire GIWW system. Clearly, movement through the lock was slow at times and dangerous at others. The lock's practical capacity was exceeded and the facility was severely overworked for a period of twenty years. This resulted in increased maintenance costs and further damage to an already aging structure. The lock's critical location in the busiest stretch of the GIWW was described as a major bottleneck for shipping. The replacement of the Vermilion Lock was necessary.

Locks	Size, feet		Cost	Elevation of Sill*	Opened to Navigation
	Width	Length			
Berwick	45	300	\$ 2,100,000	- 9.0	1951
Inner Harbor Navigation Canal (leased)	74	626	8,648,492	-31.5	1923
Harvey	75	415	1,775,132	-12.0	1934
Vermilion	56	1,182	330,765	-11.3	1933
Calcasieu	75	1,194	2,133,527	-13.0	1950
Algiers	75	760	5,215,700	-13.0	1956
Bayou Sorrel**	56	790	4,700,948	-14.0	1951
Bayou Boeuf**	75	1,148	2,754,000	-13.0	1954
Port Allen	84	1,188	13,902,222	-13.75	1961

*Mean low Gulf level, feet.

**Constructed and operated under the project, "Flood Control, Mississippi River and Tributaries."

Table 4. Size of Locks in the New Orleans District on the GIWW (Lower Mississippi Valley Division, C.O.E. 1981).

CHAPTER 8

CRITICAL ASSESSMENT

Introduction

The following section examines the performance of the Vermilion Lock as originally designed. This section is particularly important to a National Register assessment because it addresses issues of functional design integrity. The questions that will be addressed are as follows: (1) Did the Vermilion Lock adequately perform the functions it was designed to? (2) Did the lock provide the Mermentau River Basin with protection from salt water intrusion and flooding? (3) Were the demands of shipping in the GIWW met? All of these issues are addressed; quotes from C.O.E. correspondence files are used to provide the reader with the New Orleans District's opinion of the ongoing performance of the Vermilion Lock. Modifications to the original design as well as brief explanations of the historical prototypes of the original design components will be discussed.

Elevation

The top of the lock is at an elevation of 6 feet above m.l.g.; the top of the gates, when open, are 4 feet above m.l.g. On many occasions the tide from the Gulf exceeded this height and overtopped the gates (Figure 29). Such conditions were caused by storm surges associated with hurricanes. More frequently, the Mermentau River Basin to the west of the structure would exceed 4 feet m.l.g.. This was quite common during the rainy season in southern Louisiana (spring), or when winds from the north would push water out of the Basin toward the Gulf. When salt water did come in from the Gulf, the lock would shut down for navigation. The reason for this was that the eastern gates had to remain up in order to stop, or at least to decrease the amount of salt water entering the Mermentau River Basin. When flooding from the Basin reached stages above 4.0 m.l.g., the gates were dropped and the water was allowed to flow unchecked through the lock. Navigation during these periods, when possible, was very difficult and dangerous. Therefore, it may be concluded that the elevation of the lock was insufficient from the beginning.

Lock Chamber

When the gates lowered into the chamber on the west, or Mermentau Basin end, the effective length of the chamber was reduced. Operators had to be very careful to allow enough room for the gates to raise under



Figure 29. Gulf waters overtopping the east gates
(Courtesy New Orleans District, C.O.E.).

the moored barges. On occasion, the tows were tied up too close to the west end of the lock and the gates would strike the hulls of the barges while they were being raised. This resulted in damage to both the craft and to the gate (Harold Trahan, personal communication 1988).

The depth above sill for the Vermilion Lock chamber was sufficient when the lock was constructed, since the depth of the GIWW was only 9 feet at that time (see page 8). When the GIWW was dredged to 12 feet (10 years after completion of Vermilion), the lock became a problem to navigation. In an assessment of the state of affairs at the Vermilion facility,

Project Engineer Steven Martin stated:

The existing Vermilion Lock, constructed in 1933, acts as a "bottleneck" to navigation since it is the controlling structure on the Louisiana Section of the GIWW both in width (56 ft.) and depth (-11.3 ft. m.l.g.). Also, the tumbler type gates of the present lock are unsatisfactory since, once they are lowered to pass flood flows, they cannot be safely raised until the differential stage across the lock is reduced to about 0.5 feet (Steven Martin to C.O.E., 10 Dec 1984).

As noted above, the Vermilion Lock was constructed as an earthen chamber between gates and valves. The roller gates and sluice valves are housed within concrete sections of the chamber at the east and west end of the lock. A section of concrete wall that has proven troublesome was a narrow section that protected the gate arm assembly. At this location, the cross section of the concrete wall is greatly reduced to compensate for the gate operating machinery recess (Figure 30). This narrow section of wall was damaged repeatedly by ships striking the lock chamber at this section. The narrow concrete wall has flexure and is, at times, pushed in far enough to interfere with the smooth operation of the cantilever arm mechanism. When this occurred, it was necessary to jack out and shim the wall so that the arm would not rub while operating. In response to this problem, 3/4" sheet metal was installed on the lock wall at these points in an attempt to reduce rubbing on the concrete. It has been previously noted that these sheets have been whittled from a 3/4" to a 1/4" section in a period of two months (Harold Trahan, personal communication 1988).

VERMILION LOCK, LA.
WEST GATE OPERATING MACHINERY
PARTIALLY ERECTED
JULY 15, 1933.



Figure 30. West gate operating machinery recess
(Courtesy New Orleans District, C.O.E.).

Gates and Gate Mechanisms

Because the gates were often operated in the blind, at times they would not rest flat in the chamber. "In the blind" refers to the fact that the gates fall out of sight while closing. Debris would often collect in the recess and prevent the gates from fully extending. If the gates did not fit totally into the chamber, they were prone to being struck by barges. This resulted in denting of the top of the gate. The only way to tell whether or not the gate was down was by observing a device that was welded to the gate arm; this device proved unreliable. Mr. Trahan (personal communication 1988) stated that there was no accurate way of telling whether or not the gate was fully recessed. Once the gate was dented, it was impossible for it to lie flat in the chamber. The existing sill depth of the lock was so low that this became a serious problem. In effect, a dented gate when lowered reduced the usable sill height in the chamber. As previously stated, Mr. Harold Trahan had to replace five separate gates during the two years he served as lockmaster at Vermilion. An additional problem noted by Mr. Trahan (personal communication 1988) was that when extremely long barges entered the lock and were improperly moored, the gate might actually strike the underside of a barge as it was being raised. To summarize, in a letter from Hugh L. Brownlee, Chief Engineer Operations Division, it was stated:

The height of the Vermilion Lock gates at 4.0 m.l.g. causes problems in operations and maintenance. Ten times since January of this year the lock was closed for a period, due to high waters overtopping the gates. The gates are also susceptible to damage, because of poor visibility with light tows or tows with high rakes. Two gates have been damaged and replaced in the last two years at a cost of \$20,000.00 per gate (Hugh L. Brownlee to Mr. Breerwood, Chief, Planning Division, 20 April 1973).

The shock absorber springs at the end of the cantilever arms did not seem to provide adequate protection for the arms. On many occasions, when the gates were struck, the arms themselves would be twisted out of

shape or crack (Figure 31). As a result, custom-ordered spare arms made to the original specifications had to be kept on site.

As previously stated, the gates are hinged and pinned at the bottom of the lock chamber; both gates lower toward the Gulf of Mexico. This design proved to be problematic on many occasions. When flooding from spring rains or strong northern winds persisted in the Mermentau River Basin, the gates were lowered in order to drain the farmlands and pastures to the north and to the west of the Vermilion Lock. When this was done, it was often impossible to raise the gates for several days. The gates in fact could not be returned to their upright position until the differential between the east and west ends was no more than 4 inches. The reason for this was that the gate operating machinery was not powerful enough to raise the gates against the currents produced by the rushing floodwaters. In hindsight, it would have been a better design solution if one of the gates had been designed to open toward the Gulf of Mexico. If this had been done, at least one of the gates could have been picked up with the strong current; it then would have been easier to raise the opposing gate once one gate was up. It is easier to pick a gate up with the current than against it.

Shipping

The narrow width of the Vermilion Lock proved to be restrictive in the transport of overwidth tows. Such tows are associated with moving components of, among other things, drilling platforms. When such tows were allowed into the GIWW, they had to divert to the Schooner Bayou Control Structure. However, the clearance depth at Schooner Bayou is only 9 feet below m.l.g. When vessels of deeper draft had to travel from the west to the east, it was necessary for them to go into the open waters of the Gulf of Mexico. In some cases, tows were broken and double-tripped through Vermilion; this incurred an additional operating cost.

Shut Downs

The mechanical troubles described above resulted in periodic shutdowns at the Vermilion Lock facility. These difficulties created a huge bottleneck in a very heavily utilized area of the GIWW. The dammed diversion channel was only opened when lengthy and extensive repairs were performed on the lock. Otherwise, traffic had to either wait for repairs to be completed or take alternate routes. If the diversion channel was opened, tugs and barges navigated against a difficult current with no guidewalls. Many times, barges were propelled by tugs of insufficient horsepower. When these encountered the strong currents,

they could be turned and/or run aground (Harold Trahan, personal communication 1988) (Figure 32). If the original design had included an emergency dam system, operations during shutdowns would have proceeded more rapidly. In addition, an emergency dam would have made it easier to dewater the lock to facilitate repairs or maintenance in the dry.

Conclusions

When the Vermilion Lock was designed, it was intended to function as a salt water barrier, flood control device, and navigation lock. No specified dimensions were required or demanded by the shipping industry in 1932 (Table 5). At that time, agricultural commodities far outweighed industrial interests on the waterway. The designers obviously did not foresee the incredible increase in the amount of petrochemical industrialization in Louisiana for the area between the Sabine and Atchafalaya Rivers.

The immediate growth in the shipping of petroleum products through the Atchafalaya/Sabine section of the GIWW resulted in a widening and deepening of the waterway ten years after the construction of Vermilion. This occurred in response to the fact that a greater number of large watercraft were using the system. The depth of the GIWW became 12 feet. The Vermilion Lock soon became the limiting structure in this section of the waterway because of the 11.3 foot sill height (Table 6). One of the most puzzling problems with the design of the lock concerns the tumbler gates:

Gates and operating machinery at Vermilion Lock are not designed to operate against any type of differential head. Heavy rains over the basin produce high water on the inside. In order to relieve high waters on the inside, both gates must be laid down. Marine vessels are then forced to navigate against or with a high velocity current. Tows traveling against the current many times cannot make headway and are delayed (Hugh L. Brownlee to Mr. Breerwood, 20 April 1973).

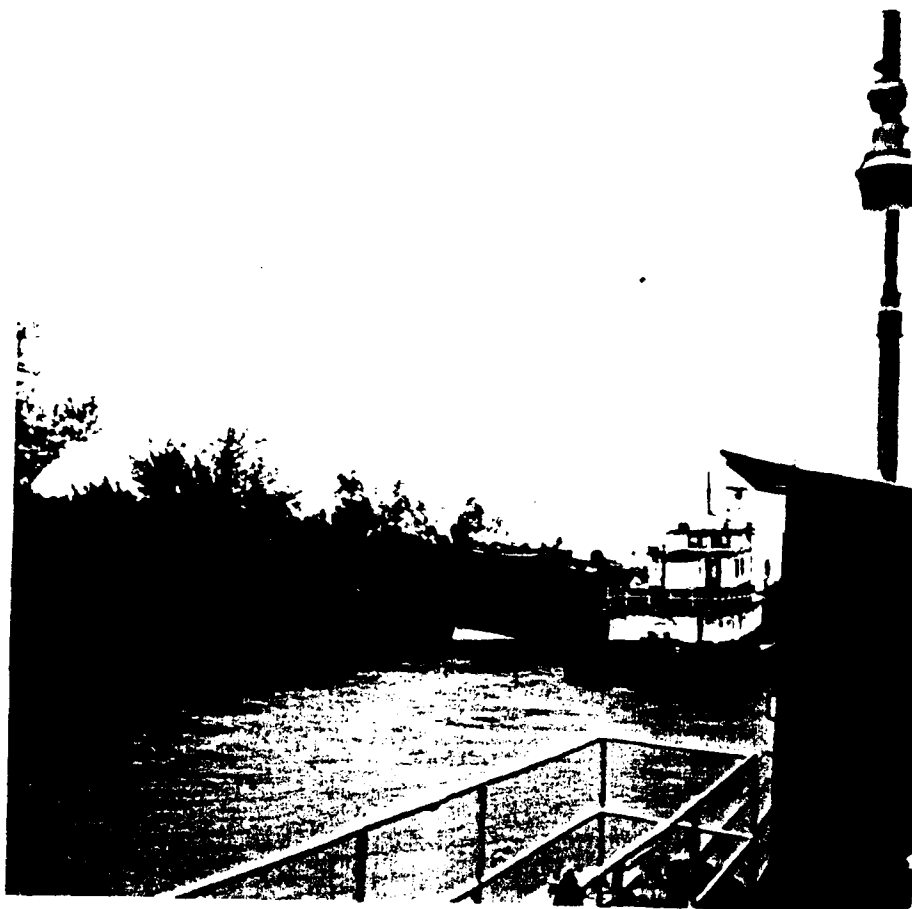


Fig. 2. View of the hotel and lighthouse from the ship's deck.

<u>Name of lock</u>	<u>Act</u>	<u>Project document</u>	<u>Size in authorized plan</u>	<u>Size constructed*</u>
Vermilion	R&H 3/3/1925	H 238/68	None	56'x1182'x11.3'
Harvey	R&H 3/3/1925	H 238/68	75'x425'x12'	75'x425'x12'
Algiers	R&H 7/24/1946	S 188/78	75'x760'x13'	75'x800'x13'
Calcasieu	R&H 7/24/1946	S 231/79	75'x425'x12'	75'x1206'x13'
Port Allen	R&H 7/24/1946	S 242/79	56'x500'x12' (tentative)	84'x1202'x13.75'
Bayou Boeuf	FC 5/15/1928 as amended	None	None	75'x1156'x13'
Bayou Sorrel	ditto	None	None	56'x797'x14'

*Depth below mean low gulf level.

Table 5. Specifications of Locks in the New Orleans District (New Orleans District, C.O.E. 1965).

<u>Name of lock</u>	<u>Width</u> (feet)	<u>Length available</u> <u>for full width</u> (feet)	<u>Depth over</u> <u>sill at mlg</u> (feet)	<u>Date of</u> <u>completion</u> (year)
Harvey	75	425	-12.0	1935
Algiers	75	800	-13.0	1956
Bayou Boeuf	75	1,156	-13.0	1954
Calcasieu	75	1,206	-13.0	1950
Vermilion	56	1,182	-11.3	1934
Bayou Sorrel	56	797	-14.0	1952
Port Allen	84	1,202	-13.75	1961

Table 6. Sill heights of Locks in the New Orleans District (New Orleans District, C.O.E. 1965).

The impacts upon the shipping industry are clear. It was a mistake not to have designed the lock with gates appropriate for handling differential heads. It seems that two sets of miter gates may have been appropriate. The technologies certainly existed at the time. The Inner Harbor Navigation Canal Lock was completed by the Corps of Engineers in 1923, and was the first lock to employ such gates (Dobney et al. 1987). For some reason, perhaps financial, the Vermilion Lock was not adequately outfitted.

The predecessor of the tumbler type gates at Vermilion was a bear trap mechanism used in Pennsylvania in the 19th century. Josiah White of Philadelphia developed this mechanism in 1818 (Wegman 1907:344). This type of gate was hinged at the bottom and was used in a more complex arrangement originally; this can be seen in Figure 33. Two gates were employed in this system. These gates were used on the Lehigh River in 1819 (Dobney et al. 1987:135). The use of such gates was abandoned for several reasons:

Several objectionable features are associated with the bear trap gate type. These include the necessity to lift a great amount of water during the raising operation. Additionally, the friction between the two gate leaves made it extremely difficult to operate the gate smoothly despite the use of rollers. Gates of this type were prone to damage caused by sudden, jerking stops which tended to break the stay chains. As a result, this gate type soon became obsolete (Dobney et al. 1987:135).

Another problem with the Vermilion Lock gates was that they fit into a recess in the chamber floor. As a result, the action of the gates did nothing to clear the area below them of debris. Miter gates tend to sweep debris out of the gate chamber. As a result, the gates were opened with logs or other debris pinned beneath them. This, combined with an inaccurate system for gauging the location of the gate resulted in periodic striking or scraping of the gate top when it was not flush with the bottom of the chamber. In effect, this reduced the already low effective sill height still further.

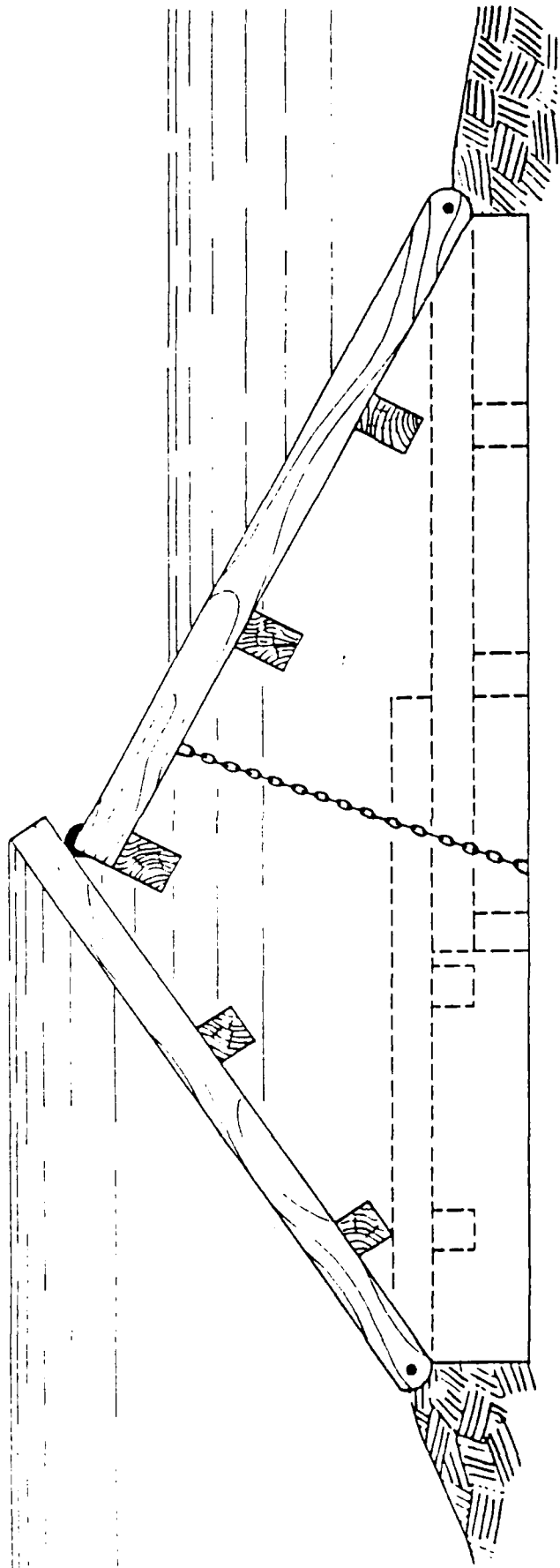


Figure 33. Bear Trap gate mechanism (Dobney et al. 1987 after Wegmann 1907).

In addition, the Vermilion Lock was built at an insufficient elevation. This tended to hinder the structure's ability to provide adequate protection against salt water intrusion. With gates at 4 feet above mean low gulf level, water from storm surges and high tides overtopped the gates. During these stages, the gates cannot be opened and the lock is closed for navigation. The Leland Bowman facility which replaced Vermilion in 1985 was constructed with gates at a 9 foot m.l.g. elevation; it has quadrant type gates.

Structurally, the Vermillion Lock seems to have held its own. There is little evidence of serious differential settling and structural cracking. Any large spalls in the concrete were a result of marine accidents rather than insufficient design techniques (Figure 34). One clear mistake in the original concrete structure is the reduced width of the lock wall at the gate operating machines. Problems associated with this thin wall were aggravated by repeated ramming and rubbing by water craft. The thin section tended to flex, thus reducing the area in which the arm was allowed to operate. The tolerances for the arm were cut very close; it needed every inch of that chamber to operate. When the wall was pinched, the arm would rub. This meant the lock had to be closed for repairs. Solutions to this problem may have been either an increased section of concrete at this location, or the placement of the gate operating machinery behind the lock wall.

The Vermilion Lock complex seems to have experienced operational problems beginning ten years after its dedication. Its restrictions on shipping should be clear at this point. There is no doubt that the petrochemical boom caught the area by surprise; the lock designers did not anticipate the jump in size and number of watercraft using the GIWW. Separate from this issue, the lock apparently did not adequately provide protection against salt water intrusion in the Mermentau Basin. The gate elevations are far too low to have been effective against storm surges and certain tides. Although the lock did drain the Mermentau River Basin quite effectively, navigation during these periods became treacherous.



Spalling concrete pile 11/6/71



Figure 34. Concrete spalling resulting from marine accident (Courtesy New Orleans District, C.O.E.).

CHAPTER 9

REPLACEMENT OF THE VERMILION LOCK

Introduction

This section presents the events that led to the eventual replacement of the Vermilion Lock with the Leland Bowman facility in 1985. Many maintenance, modification, and operational issues raised in previous sections will be reiterated here. In addition, correspondence between the New Orleans District, Army Corps of Engineers and representative of the American Waterways Operators, Inc. will be presented in order to demonstrate the way these two agencies worked together to determine final dimensions for a new lock. A plan for a dual lock system was once considered; this would have left Vermilion in operation. Pros and cons of this proposal will also be presented.

Reasons for Replacement

The reasons for the inadequacies of the Vermilion Lock facility should be clear at this point. The structure never operated as was intended, and mechanisms such as the gates and operating machinery proved unreliable and troublesome. Extensive repair of the lock would be necessary to make it a reliable facility once again. The New Orleans District did not see this as a particularly desirable nor justifiable alternative. The Corps saw no reason to spend money to improve a lock that possessed inadequacies in terms of width, length, and depth. In essence, the design of the lock was an outdated solution to the problem at hand. The Vermilion Lock was one of the heaviest traveled locks in the New Orleans District and is located on the busiest stretch of the entire GIWW. For years, the lock was a bottleneck for marine transportation; long waits for tows were typical.

In 1965, the New Orleans District produced a report entitled Replacement of Vermilion Lock (New Orleans District, C.O.E. 1965). This report described in detail the function of the original project and the significance of the location for shipping, farming, and grazing pastures. This document also addressed specific issues of operational difficulties, modifications, and reasons for delays. The report concluded:

The existing Vermilion Lock is inadequate for present and future navigation on the Gulf Intracoastal Waterway. The lock is a restriction in the waterway because of its width and

depth and will, in the near future, have inadequate capacity to pass the waterway traffic anticipated. The lock cannot be adequately operated for both navigation and flood control because of its tumbler-type gates. Once both gates are lowered, they cannot be raised against a differential head of more than a few tenths of a foot. The lock is now passing waterway traffic at near its practical tonnage capacity. Traffic on the waterway is anticipated to continue to increase to about 60 million tons by the end of the 50-year project life (2018). Therefore, the replacement of Vermilion Lock is absolutely essential to assure the continued development of the Gulf Intracoastal Waterway (New Orleans District, C.O.E. 1965).

In addition to impacts on navigation, a new lock was seen as an improvement to environmental control for which the original lock was intended. Higher gate elevations would retain more salt water, thus helping preserve fresh water marshes and improving the conditions for growing rice. Further, it was anticipated that a new, larger lock would provide greater relief from the Mermentau flood waters.

Dual Lock Proposal

The New Orleans District believed that the need for a 110 foot chamber would not become necessary for a decade or so. Therefore, it seemed that there was sufficient reason to keep the Vermilion Lock functional and to employ a dual lock system. The Corps proposed that the new lock (Leland Bowman) be constructed with a chamber width of 75 feet. This facility was significantly cheaper to build and seemed to be a more expedient solution to the existing problem. The American Waterways Operators desire for a larger lock seemed to establish an advantage for a dual lock solution:

The dual lock system, utilizing initially a new lock 75 feet wide by 1,200 feet long in conjunction with rehabilitation of the existing Vermilion Lock would involve considerably less delays to traffic than would a single 110 feet wide by 1,200 foot lock. These include greater operational flexibility, assurance against traffic interruptions, both accidental and planned, and increased flood relief for the Mermentau Basin (Richard Hunt, Colonel, District

Engineer to McVey Ward, American Waterways Operators, 29 June 1972).

This idea was greeted with a good deal of skepticism by the American Waterways Operators. A response to this letter from Col. Hunt by the A.W.O. may best illustrate the organization's positions at the time:

We appreciate the thoroughness of your examination of all aspects of the replacement of Vermilion Lock and the detailed data you gave us in your letter of June 29, 1972. I am sure you know that the Vermilion Lock situation is a matter of great concern to members of AWO. While the conclusions reached by your office that a dual lock system represents the best arrangement for replacement are persuasive on the basis of the data which you outlined, this continues to be a vexing problem for us from an industry standpoint....

This continues to be the position of AWO in the belief that the long range needs of the industry will be served best by construction of a replacement lock having the larger dimensions. AWO still believes that the best course of action is to pursue a program for replacement with the larger lock chamber (110 ft.) in spite of the expediency which might be accomplished by replacement with a dual lock system with two locks having the dimensions of the present chamber (Braxton B. Carr, President, AWO to Col. Hunt, 2 November 1972).

Mr. Carr's concern was justified by statistics that indicated that fewer total barges were carrying more tonnage. A fluctuation in the number of vessels transiting the lock coupled with an increase in net tonnage indicated new trends within the maritime industry (Table 7). It appeared logical: the fewer barges moved, the cheaper the shipping costs. It seemed that the New Orleans District was responsive to the pleas of the American Waterways Operators.

As stated, the final decision was reached through negotiations and discussions with the American Waterways Operators. The dual lock proposal was abandoned for several reasons. One consideration for shelving the idea was that the only access for the new lock would be across the diversion channel of the old lock. This meant the construction

Calendar Year	Millions of Tons	Number of Vessels
1965	28.7	53,300
1966	33.7	57,400
1967	35.9	56,500
1968	40.8	62,435
1969	43.0	62,783
1970 (10 months actual)	39.4	54,435
1970 (projected)	45.0	59,400

Table 7. Tonnage Within the Vermilion Lock,
1965-1970 (Braxton B. Carr to Col.
Herbert Harr, December 22, 1970).

of a new channel to once again link the old lock with the GIWW. A second reason was that the machinery in the old lock was improperly designed to operate against a strong differential head. It was determined by the Corps of Engineers, New Orleans District, that the new Leland Bowman Lock alone would provide sufficient flood relief for the Mermentau Basin because of its superior quadrant type gate system. These gates can be cracked open and control the filling and draining of the lock chamber themselves. This eliminates the need for sluices (Nettles, 11 March 1985).

Conclusion

The replacement of the Vermilion Lock was welcomed by all interests involved. It was seen as a relief to the shipping industry and to the region. In a letter to the New Orleans District Chief of Planning Division, Hugh L. Brownlee stated:

Replacement of the existing Vermilion Lock should proceed with all due haste to relieve navigation from congestion, to adequately protect the basin from flooding, to reduce the amount of marine accidents to the lock, and to promote industrial expansion to its full potential (Hugh L. Brownlee to Mr. Breerwood, 20 April 1973).

Legislation for the replacement of the Vermilion Lock was within the guidelines of the Rivers and Harbors Act of 1909. The Secretary of the Army approved the replacement of this facility in May, 1967. The new Leland Bowman Lock was completed in 1985, and is located just west of the Vermilion Lock. The former's dimensions are 110 feet by 1,200 feet; the depth above sill is 15 feet below mean low Gulf elevation (Lower Mississippi Valley C.O.E. 1987). The lock is equipped with sector gates; the top of these gates are at an elevation of 9 feet above m.l.g.. These gates prevent salt water intrusion more efficiently, they facilitate drainage, and they eliminate undue delays to navigation (New Orleans District, C.O.E. 1965:30). The Leland Bowman Lock was officially opened for traffic on March 21, 1985. The Vermilion Lock was kept ready for operation for a period of nine months after the opening of the new lock (Harold Trahan, personal communication 1988).

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

This chapter will summarize the salient points previously discussed and apply to them the guidelines for eligibility established by the National Register of Historic Places (36 CFR 60.4). Critical to National Register assessment is the establishment of the historic theme or context specific to the construction of Vermilion Lock. In this case, the historic theme is straightforward: the Vermilion Lock is associated with the economic development and environmental regulation of the Mermentau River Basin area. The lock is located in a critical position along the Gulf Intracoastal Waterway and, as a result, has influenced patterns of shipping commodities across the Gulf Coast of the United States. The function of Vermilion Lock within this context is addressed below.

Critical to National Register assessment is a discussion of integrity. Is the lock intact such that it displays the characteristics of its original design and construction? Issues of integrity have been touched upon in Chapters 5 and 6 of this report. The results of research and on site inspections will be summarized. All significant changes to the original design will be reiterated. The lock will also be examined within the context of the historic development of the sciences of structural and mechanical engineering.

In National Register terminology, the Vermilion Lock may be understood as a structure:

...a work made up of interdependent and interrelated parts in a definite pattern of organization. Generally constructed by man, it is often an engineering project (National Register Guidelines, 36 CFR 60.6).

In order to be eligible for the National Register of Historic Places as a structure, elements of the original design must be intact, or if not, have been replaced in such a fashion as to preserve the historic design, materials, and level of craftsmanship. This is a key issue; details will be presented.

Historic Themes

The Vermilion Lock must be examined within the confines of the historic contexts associated with the period and geographical area in which it was built. These themes must then be demonstrated to be significant within American history, and historical significance may be on a local, regional, or national level. The themes specific to this assessment are the industrialization of Southern Louisiana (regional), the growth of the Gulf Intracoastal Waterway (national), and the control of flooding and salt water intrusion in the Mermentau River Basin (local/regional). The following text will briefly present these themes and assess the way in which the construction and operation of the Vermilion Lock impacted each.

The Industrialization of Southern Louisiana

The agricultural focus of Southern Louisiana began to change in the early twentieth century. The discovery of large reserves of oil and natural gas in combination with established agricultural traditions increased the necessity to transport commodities. This required the construction and maintenance of navigable, inland waterways. In addition, structures designed to mitigate tidal and flooding conditions were needed. The River and Harbor Act of 1909 foresaw these needs and provided legislation to facilitate construction of waterways and control structures. The Vermilion Lock was built under the provisions of this Act. The question remains: did the construction of the Vermilion Lock significantly contribute to the process of industrialization?

This research suggests that that lock may have been an adequate facility for industrial expansion when it was first constructed. However, district locks are typically constructed with 50 year anticipated lifespans. Therefore, the assessment of significance within the theme of regional industrialization is linked to continued performance over a period of 50 years. Within this framework, the Vermilion Lock may be understood as an insufficient, underdesigned facility. As noted in previous chapters, problems at Vermilion began 10 years after its construction when the GIWW was enlarged.

The petrochemical and agricultural interests in Southern Louisiana depended heavily upon reliable, well designed waterways, locks, and control structures. Rapid movement of commodities was directly related

to industrial productivity. As previously discussed, the Vermilion Lock often slowed traffic on the GIWW. During maintenance and repair operations, the lock was often closed for long periods of time. Barges would either be stranded or rerouted. Rerouting was often difficult, usually expensive, and sometimes dangerous. Depending upon the size and draft of the vessels, it was sometimes necessary to reroute through the Gulf of Mexico. In these cases, the protection afforded by inland navigation was lost, and the tows were subject of adverse Gulf conditions such as squalls and storms.

Because of these frequent delays and expensive inconveniences to marine traffic, the Vermilion Lock cannot be viewed as a structure which significantly helped the industrialization of the Gulf region in Louisiana. The inadequate size and sill depth at Vermilion made navigation expensive and time consuming. Ultimately, the Vermilion Lock did move water traffic; it functioned for over fifty years as a tool to navigation. However, for the majority of that period it negatively affected the growing industrial economy. Therefore, within the theme of the industrialization of Southern Louisiana, the Vermilion lock is not viewed as historically significant.

The Growth of the Gulf Intracoastal Waterway (GIWW)

The GIWW was built in connection with the U.S. Intracoastal system. The total system consisted of some 2,700 miles of waterways which were authorized by the River and Harbor Act of 1909. The project was executed by the United States Army Corps of Engineers:

It was designed to afford a protected coastal waterway route along the Atlantic and Gulf coasts of the United States. With the full realization of this project, commercial tows and other light-draft vessels, unsuited for navigating long stretches of the open Atlantic Ocean and the Gulf of Mexico... (Dobney et al. 1987: 85-86)

The Intracoastal Waterway was originally initiated in a series of small, scattered projects beginning in 1828. The work became more directed in the early twentieth century, and was finally completed in the mid 1960s (Dobney et al. 1987:87). This waterway is critical to preserve safe, consistent shipping lanes in the United States.

As noted in previous chapters of this report, the Vermilion Lock is located on a critical stretch of this waterway. The area between the Sabine and Atchafalaya Rivers is by far the most heavily utilized section of the entire GIWW system. As petrochemical and related industries developed strong regional footholds, shipping increased dramatically. This part of Louisiana has been referred to as the "petroleum corridor" and is vital to the State's economy. The Vermilion Lock was certainly tested as a facility; in fact, it was pushed far beyond its practical capacities.

There were several problems associated with the design of the lock which caused it to be referred to as a "bottleneck" in the GIWW. In fact, the Vermilion Lock became the limiting structure along the waterway. In addition, the lock also functioned as a regional control structure for flooding and salt water intrusion. When the Mermentau River Basin experienced high waters associated with rains or prolonged northern winds, the lock would drop both gates and let the basin drain. During these periods, navigation was difficult. The gates could not be raised against the current and often remained down for several days. Tugs then had to navigate against a strong current; many simply were not powerful enough to traverse the lock. These conditions led to serious delays as well as substantial damage to the lock. Further, when salt water at the east end of the lock rose to 4.0 feet m.l.g. or above (the elevation of the gates), the lock would close to navigation. Tows then would have to either tie up on the GIWW and wait out the tide or find alternate routes of travel.

In short, the Vermilion Lock severely hampered travel along the GIWW and thus cannot be considered a positive component along the waterway. It not only limited the size and number of craft passing through the Sabine/Atchafalaya "petroleum corridor," it also saddled the shipping industry with additional costs and dangerous conditions. As stated, the chief goal of the GIWW system was to provide safe, inland shipping for industrial and agricultural interests. The Vermilion Lock had quite the opposite effect and thus was detrimental to the GIWW system. The Vermilion Lock is therefore not historically significant under the theme of GIWW development.

Environmental Control: Mermentau River Basin

The Vermilion Lock was originally designed primarily as a guard structure within the area of the Mermentau River Basin. Its functions included both flood relief and prevention of salt water intrusion for the basin. The lock served to drain floodwaters and prevent salt water intrusion by acting as a dam. Records seem to indicate that the Vermilion Lock was quite successful for the former purpose, and less successful for the latter.

In terms of flood relief for the basin, the Vermilion facility did in fact work quite well. Almost immediate flood relief was experienced at areas to the north and west of the lock when the gates were dropped. This region produces a great deal of rice and is also used for cattle grazing. The control of water levels is critical to both. During the mid 1970s an agreement was reached between farmers, ranchers, and the New Orleans District as to an optimum "inside" elevation. The agreement was 2.0 feet above m.l.g.; this is now standard operational procedure of the Corps of Engineers. If there is too much water in the Basin, rice fields, already at a low elevations, flood and crop yields are greatly reduced. Further, the amount of usable grazing land for cattle is diminished when water levels are high.

The Vermilion Lock operators kept a watchful eye on the western, or inside elevations. If too much water was in the basin, it was drained. If conditions were dry, the lock served to maintain or hold as much fresh water as possible. As noted, its location was such that it did provide adequate and at times immediate relief during periods of flooding. During certain times this was accomplished at severe costs to safe navigation. In any case, there is a strong argument to be made in favor of the role the Vermilion Lock played in maintaining reasonably consistent conditions in the Mermentau River Basin. It was indeed significant in regards to flood control.

The issue of salt water protection is more debatable from a functional standpoint. Because the gates at Vermilion were set at 4.0 feet above mean low Gulf, certain tidal conditions overwhelmed the facility. There were many times when the tides of the Gulf of Mexico exceeded this level and pushed large volumes of salt water towards the Mermentau Basin. Lunar stages as well as storm surges accounted for these conditions. Hurricanes also were a serious problem. When tidal stages exceeded the

4.0 level, salt water overtopped the gates and entered the basin. This threatened both agricultural interests and wildlife dependant upon fresh water marsh habitats. It is clear that the gates at Vermilion were built too low to function adequately as a salt water barrier.

In conclusion, the Vermilion Lock was designed to function as both a flood water regulator and salt water barrier. In order to be considered significant within this regionally important theme, it would have to satisfy both functional requirements. It did not. Therefore, the Vermilion Lock cannot be considered significant under this theme and is disqualified from National Register consideration in this specific area of regional historic development. In summation, the Vermilion Lock complex cannot be regarded as significant within any of the three thematic contexts presented here: The industrialization of Southern Louisiana, The development of the GIWW, or the environmental control of the Mermentau River Basin.

National Register Criteria Considerations

The National Register of Historic Places has established four criteria for weighing the significance of a structure (36 CFR 60.4). In order to be considered potentially eligible for inclusion on the Register, a structure must meet the requirements of at least two of the four criteria. The two criteria this report is concerned with are Criteria A and C. Is the Vermilion Lock:

...associated with events that have made a significant contribution to the broad patterns of our history...
(Criterion A: 36 CFR 60.4:1)

or does the lock:

embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction... (Criterion B: 36 CFR 60.4:1)

In addition to strong, positive association with an established theme, the structure must also satisfy the requirements of integrity for each separate criterion. Under Criterion A, the themes of these "broad historical patterns" have been presented earlier in this chapter. It is clear that although the Vermilion Lock is linked to both historical legislation and patterns of economic and agricultural development, it was not crucial in the development process. Its failure to function is not a disqualifier. In a case where the failure itself is crucial to altering or affecting history in some significant way, the failed mechanism might be considered significant for that reason. In this case, however, the failure seems to have had no such effect and the Lock may not be considered as potentially eligible for inclusion on the National Register of Historic Places under Criterion A.

In terms of Criterion C, locks have been clearly established as potentially significant types of structures. Several are on the National Register. In order to satisfy requirements here, the design issues associated with the planning and construction of the lock must have been significant within the historic development of engineering and/or water control theories. Further, the integrity of this original design must be intact such that the structure today communicates the spirit and intentions of the original design. The measures of integrity include: location, design, setting, materials, workmanship, association, and feeling (36 CFR 60.4).

The Vermilion Lock does not seem to possess the qualities necessary for National Register consideration with regards to Criterion C. The technologies employed at the facility were not particularly revolutionary. In fact, the gate mechanisms were based on a historic prototype which had not been used for a very long period of time. The gates at Vermilion seemed to prove as troublesome as were the Bear Trap gates which were constructed in Pennsylvania's Lehigh River in the early 19th century. There are several notable faults associated with the gate design at Vermilion. Both gates lie to the east, or Gulf, end of the lock. As a result, they could not be easily raised when dropped to relieve flood conditions in the basin. The gates cannot be raised against a strong current. Also, debris tended to get trapped beneath the gate; this restricted the movement. When the gate did not fully open and rest flush with the lock floor, it was often struck by ships. This resulted in the replacement of many damaged gates. Further, the gate operating machinery proved troublesome at Vermilion. The shock absorber at the end of the cantilever arm proved inadequate; many arms were twisted or

cracked by barges striking the gates. Finally, the chamber design proved to be problematic. The concrete wall section was reduced to facilitate the gate arm recess. This detail proved extremely troublesome since the wall was prone to flexure at this point. When the wall bowed in, the gate arm rubbed against it. The wall was continuously jacked out and sheet metal was added to the chamber wall in an attempt to reduce this occurrence.

The sluice valve system was less troublesome but still was not innovative by any means. The vertical gates are fairly common on lock complexes around the country and at Vermilion represent no significant design improvements, modifications, or rethought of a previous solution. In fact, by the time Vermilion ceased operations, only a few valves were still in operational condition. This illustrates the extant level of design integrity at Vermilion. None of the original gates remain, the lock chamber has been altered by the addition of plate steel to the sides, sluice guides have been modified to accept smaller replacement valve gates, and much of the machinery was relocated because of poor original placement. Finally, the constant replacement of huge sections of wing and guide walls as well as the demolition of five of the original structures on the site also attest to lack of integrity of design of the structure.

Conclusions and Recommendations

The Vermilion Lock represents an inadequate solution for its intended functional requirements. It has interfered with the regional development of industry, severely impacted shipping, and proved to be inadequate protection from salt water intrusion into the Mermentau River Basin. In addition, the design of the lock from the standpoint of historical engineering does not represent any significant contributions to the development of the sciences of structural or mechanical engineering. Further, the Vermilion Lock has undergone design altering modifications and does not, at this time, convey the condition of the lock as originally built. It is therefore concluded that the Vermilion Lock complex should not be considered for inclusion on the National Register of Historic Places; no mitigation is recommended at this time.

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Letters:

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Braxton B. Carr to Richard Hunt, 2 November 1972
Richard Hunt to McVey Ward, 29 June 1972
Steven Martin to C.O.E, 10 December 1984
C. J. Nettles to William C. McNeal, 7 April 1975
C. J. Nettles to Chief, Engineering Division, 6 January 1978
C. J. Nettles to Jewitt P. Hulin, 2 May 1978
C. J. Nettles, 11 March 1985
Mario Slavich to Chief, Maintenance Branch, 6 August 1976

Photographs

INTERVIEWS

Mr. Harold Trahan, Former Vermilion Lockmaster, October 1988

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

Parish No. _____

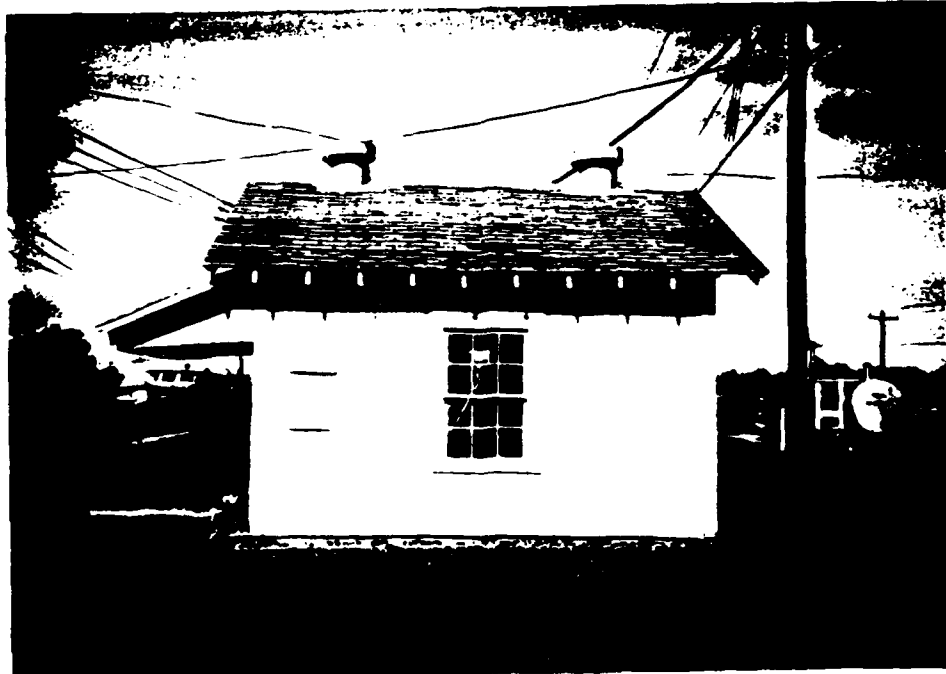
Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 24, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect _____ R _____ T _____
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-865-1121

5. HISTORICAL DATA:

Historic Name Generator Shed - Vermilion Lock Complex
Historic Use housed electrical generator for the lock facility
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks _____

7. INTEGRITY:

Unaltered _____ Minor alterations _____ Major alterations X
List Major alterations The original electrical generator has been removed from the building and placed at Berwick Lock, Morgan City, LA

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other _____

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents none. This building was not an original component of the lock complex. Original drawings obtained did not include this structure.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: ca. 1940

2. ARCHITECTURAL STYLE:

For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof

Military utility structure

3. OVERALL BUILDING SHAPE/MASSING:

Note number of stories, plan shape, bays, wings, etc.

one story, square, two bays

4. BASIC FLOOR PLAN DESCRIPTION:

For example: shotgun, bungalow, dogtrot, asymmetric, open commercial space, office, gym, etc.

Open industrial space

5. FOUNDATION:

Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)

concrete slab

6. WALL CONSTRUCTION:

For example: log, balloon framing, bousillage, brick, etc.

balloon framing

7. EXTERIOR MATERIALS:

For example: clapboard, shingle, stucco, etc.

clapboard siding

8. ROOF CHARACTERISTICS:

Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)

gable heathes with asphalt shingles

8A. ROOF FEATURES:

Note dormers, towers, cupolas, parapets, etc.

there are two large vents at the ridge

8B. ROOF TRIM:

Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.

exposed rafters at the eaves

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung wooden (6/6)

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.

wooden, glazed with six lites, trim surround

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

none

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

none

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

N/A

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple utility building erected by the United States Army. It does not attempt to be stylistic nor is it vernacular. It has no architectural significance.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

The building is associated with the Vermilion Lock complex. It was added to the facility when the electric generator was moved out of the lock operators structure. In addition, research has proven that the Vermilion Lock is not historically significant.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 24, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect _____ R _____ T _____
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-856-1121

5. HISTORICAL DATA:

Historic Name Office - Vermilion Lock Complex
Historic Use Building served as operations office for lock.
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks _____

7. INTEGRITY:

Unaltered X Minor alterations _____ Major alterations _____
List Major alterations _____

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other _____

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents Obtained original construction drawings and photographs from New Orleans District, C.O.E.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: 1932

2. ARCHITECTURAL STYLE:

For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof

20th century military office type

3. OVERALL BUILDING SHAPE/MASSING:

Note number of stories, plan shape, bays, wings, etc.

square, one story, one bay

4. BASIC FLOOR PLAN DESCRIPTION:

For example: shotgun, bungalow, dogtrot, asymmetric, open commercial space, office, gym, etc.
office

5. FOUNDATION:

Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)

round wooden piers (much like telephone polls)

6. WALL CONSTRUCTION:

For example: log, balloon framing, bousillage, brick, etc.

balloon framing

7. EXTERIOR MATERIALS:

For example: clapboard, shingle, stucco, etc.

clapboard siding

8. ROOF CHARACTERISTICS:

Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)

gable roof sheathed with asbestos shingles

8A. ROOF FEATURES:

Note dormers, towers, cupolas, parapets, etc.

fan shaped roof vents front and rear. There is one chimney located at the ridge line

8B. ROOF TRIM:

Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.

exposed rafters at the eaves

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung wooden windows (6/6)

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.
glazed wooden doors (trim surrounds)

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

small landing at front

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

none

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

The lock office is stripped of stylistic references. There are no capitals, bases, or cornices applied.

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple military structure. There was no attempt to stylize the structure. In addition, the military type represents no significant architectural movement in the region.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

This structure is associated with the Vermilion Lock Complex located on the GIWW.

Research has concluded that this lock is not a significant facility associated with this waterway.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 23, 1985

3. TOPOGRAPHIC QUAD:

Name _____ Sect R T
Size _____

4. OWNERSHIP:

Name United States Army, Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-865-1121

5. HISTORICAL DATA:

Historic Name Residence - Vermilion Lock
Historic Use Residence for lock employees and family members
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks _____

7. INTEGRITY:

Unaltered X Minor alterations _____ Major alterations _____
List Major alterations _____

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other metal support for central air conditioning unit (rear)

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents Obtained original construction drawings and photographs from the New Orleans District, C.O.E.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: 1932

2. ARCHITECTURAL STYLE:

For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof

20th Centurey Military Barracks Type

3. OVERALL BUILDING SHAPE/MASSING:

Note number of stories, plan shape, bays, wings, etc.

One story rectangular with two bays

4. BASIC FLOOR PLAN DESCRIPTION:

For example: shotgun, bungalow, dogtrot, asymetric, open commercial space, office, gym, etc.
Bungalow

5. FOUNDATION:

Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)

Round wooden piers (much like telephone polls)

6. WALL CONSTRUCTION:

For example: log, balloon framing, bousillage, brick, etc.

Balloon framing

7. EXTERIOR MATERIALS:

For example: clapboard, shingle, stucco, etc.

clapboard siding

8. ROOF CHARACTERISTICS:

Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)

gable roof sheathed with asbestos shingles

8A. ROOF FEATURES:

Note dormers, towers, cupolas, parapets, etc.

fan shaped roof vents front and rear. There are also two chimneys at the ridge

8B. ROOF TRIM:

Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.

exposed rafters at the eaves

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung 2/2 on the front 4/4 at the sides; trim surrounds

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.

wood framed, trim surrounds

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

front porch

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

none

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

The house is stripped of stylistic references for the most part. There are no capitals, bases, or cornices employed.

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple military dwelling. There was no attempt to stylize the structure and the military type represents no significant movement in the area.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

This structure is associated with the Vermilion Lock Complex and is located on the GIWW. Research has concluded that this lock is not a significant facility associated with this waterway.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

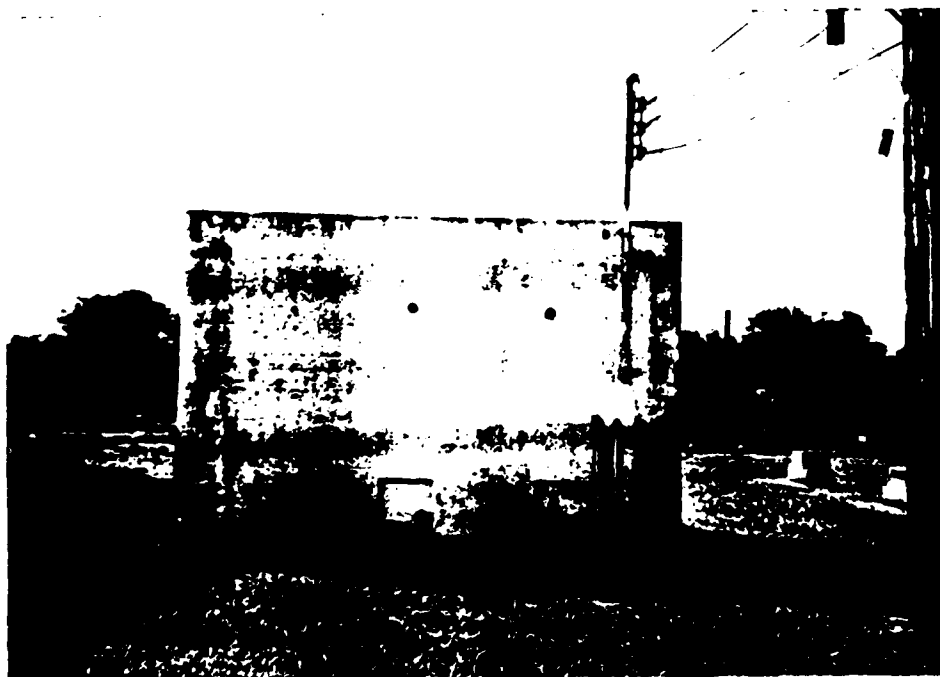
Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 23, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect R T
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-865-1121

5. HISTORICAL DATA:

Historic Name Water Filtration House - Vermilion Lock (Building 249)
Historic Use building housed a filtration system which provided drinking water for complex
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks there is a shed and a concrete pad (slab) associated with this structure.

7. INTEGRITY:

Unaltered X Minor alterations _____ Major alterations _____
List Major alterations _____

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other slab and shed

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents Original construction drawings were obtained from the New Orleans District C.O.E.. Photographs were also obtained and examined.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: 1932
2. ARCHITECTURAL STYLE:
For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof
simple utilitarian design; no stylistic traits
3. OVERALL BUILDING SHAPE/MASSING:
Note number of stories, plan shape, bays, wings, etc.
One story, square plan
4. BASIC FLOOR PLAN DESCRIPTION:
For example: shotgun, bungalow, dogtrot, asymetric, open commercial space, office, gym, etc.
Open industrial space.
5. FOUNDATION:
Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)
concrete slab
6. WALL CONSTRUCTION:
For example: log, balloon framing, bousillage, brick, etc.
poured in place concrete
7. EXTERIOR MATERIALS:
For example: clapboard, shingle, stucco, etc.
concrete is left exposed (evidence of 6" bargeboard formwork)
8. ROOF CHARACTERISTICS:
Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)
flat - built up roof
- 8A. ROOF FEATURES:
Note dormers, towers, cupolas, parapets, etc.
none
- 8B. ROOF TRIM:
Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.
none

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung, steel frames

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.

steel framed bolted and welded to concrete walls

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

none

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

none

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

none

14. INTERIOR DETAILS (if accessible):

machinery which was originally placed here has not been altered. It is now dysfunctional.

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple utilitarian structure. There are no stylistic details whatsoever. However the building should be respected for its pure functional expression and overall simplicity.
It is not a significant work of architecture.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

The building was constructed as part of the Vermilion Lock complex located on the Gulf Intracoastal Waterway. Research has concluded that this lock is not a significant facility associated with this waterway.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 23, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect _____ R _____ T _____
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-865-1121

5. HISTORICAL DATA:

Historic Name Transformer House-Storage Shed - Vermilion Lock Complex
Historic Use Housed electrical transformers and was used for storage
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks _____

7. INTEGRITY:

Unaltered _____ Minor alterations X Major alterations _____
List Major alterations _____

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other rear slab which supported some
type of electrical component.

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents Original construction drawings and photographs were obtained from the New Orleans District, C.O.E.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: constructed 1932

2. ARCHITECTURAL STYLE:

For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof

none

3. OVERALL BUILDING SHAPE/MASSING:

Note number of stories, plan shape, bays, wings, etc.

one story, rectangular plan, two bays

4. BASIC FLOOR PLAN DESCRIPTION:

For example: shotgun, bungalow, dogtrot, asymmetric, open commercial space, office, gym, etc.

open industrial floorplan

5. FOUNDATION:

Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)

concrete slab

6. WALL CONSTRUCTION:

For example: log, balloon framing, bousillage, brick, etc.

balloon framing

7. EXTERIOR MATERIALS:

For example: clapboard, shingle, stucco, etc.

corrugated metal sheathing

8. ROOF CHARACTERISTICS:

Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)

gable roof covered with asbestos shingles.

8A. ROOF FEATURES:

Note dormers, towers, cupolas, parapets, etc.

none

8B. ROOF TRIM:

Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.

none

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung, 4/4, metal frame with reinforced safety glass

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.

metal doors with trim surrounds

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

none

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

there are warning lights and a horn

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

none

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple utility building with no architectural significance.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

The building is part of the Vermilion Lock Complex located on the Gulf Intracoastal Waterway. Research has concluded that this lock is not a significant facility associated with this waterway.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

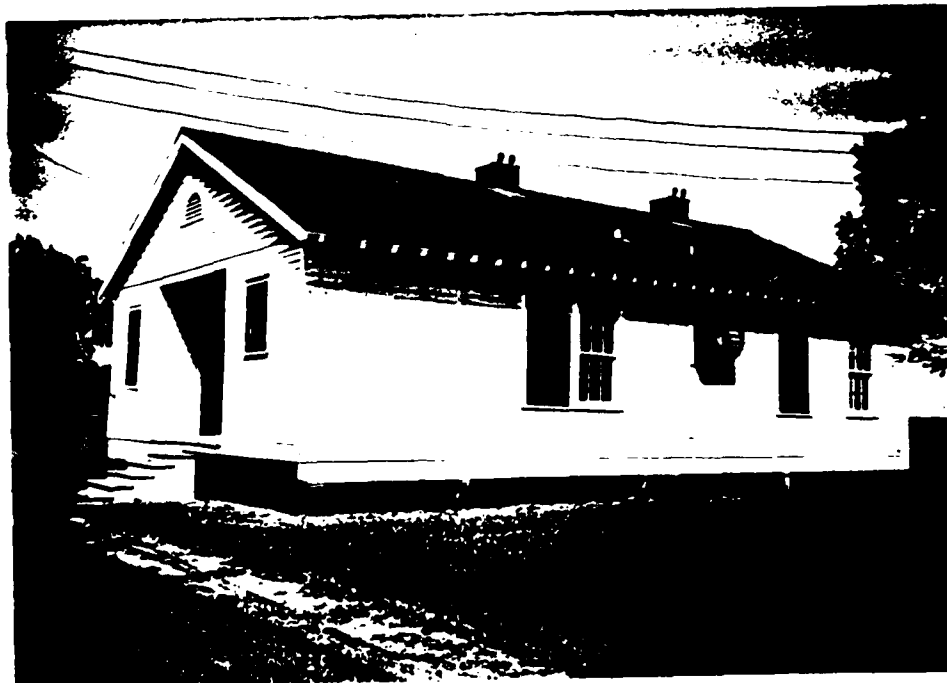
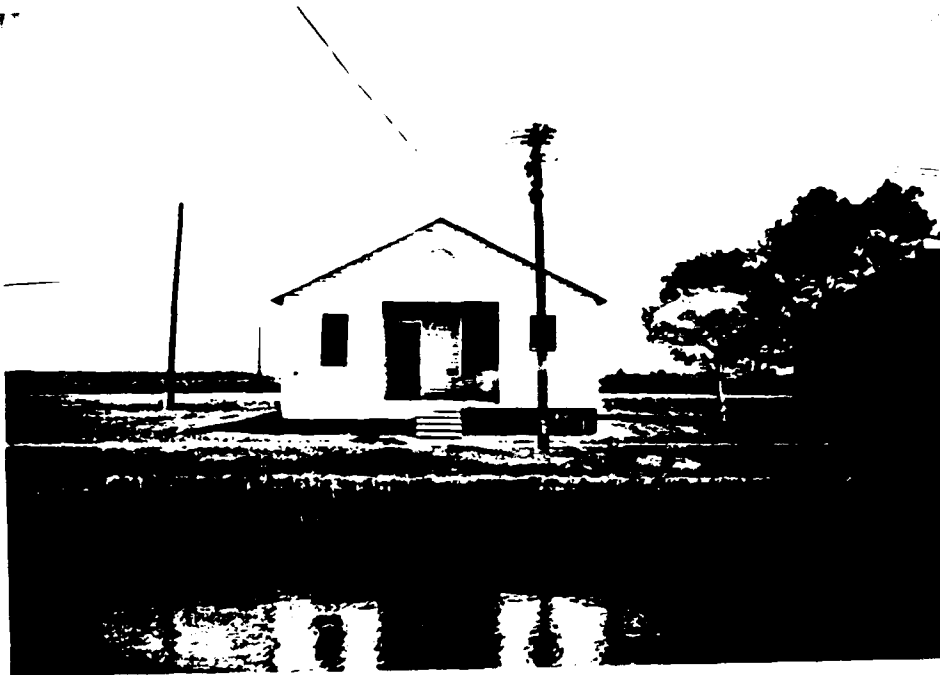
Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 23, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect _____ R _____ T _____
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504- 865-1121

5. HISTORICAL DATA:

Historic Name Residence - Vermilion Lock Complex
Historic Use Housed workers and families at the lock complex
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks _____

7. INTEGRITY:

Unaltered _____ Minor alterations _____ Major alterations X
List Major alterations Original front porch gallery has been closed in to provide two additional interior spaces. A wooden deck was added at the rear of the structure.

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other wooden deck at rear.

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Harold Trahan, former lockmaster, Vermilion Lock
Documents Obtained original construction drawings and photographs from New Orleans District, C.O.E.
Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: 1932
2. ARCHITECTURAL STYLE:
For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof
U.S. Military Barracks type
3. OVERALL BUILDING SHAPE/MASSING:
Note number of stories, plan shape, bays, wings, etc.
One story, rectangular plan, two bays
4. BASIC FLOOR PLAN DESCRIPTION:
For example: shotgun, bungalow, dogtrot, asymetric, open commercial space, office, gym, etc
Bungalow
5. FOUNDATION:
Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)
round wooden piers (much like telephone polls)
6. WALL CONSTRUCTION:
For example: log, balloon framing, bousillage, brick, etc.
Balloon framing
7. EXTERIOR MATERIALS:
For example: clapboard, shingle, stucco, etc.
clapboard siding
8. ROOF CHARACTERISTICS:
Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)
gable sheathed with asbestos tile shingles
- 8A. ROOF FEATURES:
Note dormers, towers, cupolas, parapets, etc.
fan shaped roof vents at gable ends. There are also two chimneys at the ridge.
- 8B. ROOF TRIM:
Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.
exposed rafters at the eaves

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

double hung 2/2 on the front and 6/6 on the sides, trim surrounds

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.

Paneled wooden door (not original), trim surrounds

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

small front porch (original gallery was modified); there is also a porch at the rear

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

None

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

None

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

The house is stripped of stylistic references for the most part. There are capitals, bases, or cornices employed.

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This is a simple military dwelling. There was no attempt to stylize the structure and the military type represents no significant movement in the area.

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

This structure is associated with the Vermilion Lock Complex and is located on the GIWW. However, research has concluded that this lock is not a significant facility associated with this waterway.

HISTORIC STRUCTURES INVENTORY

Louisiana Division of Historic Preservation

P. O. Box 44247

Baton Rouge, LA 70804-4247

(504) 922-0358

A. ASSESSMENT

1. LOCATION INFORMATION:

Town/vicinity Intracoastal City

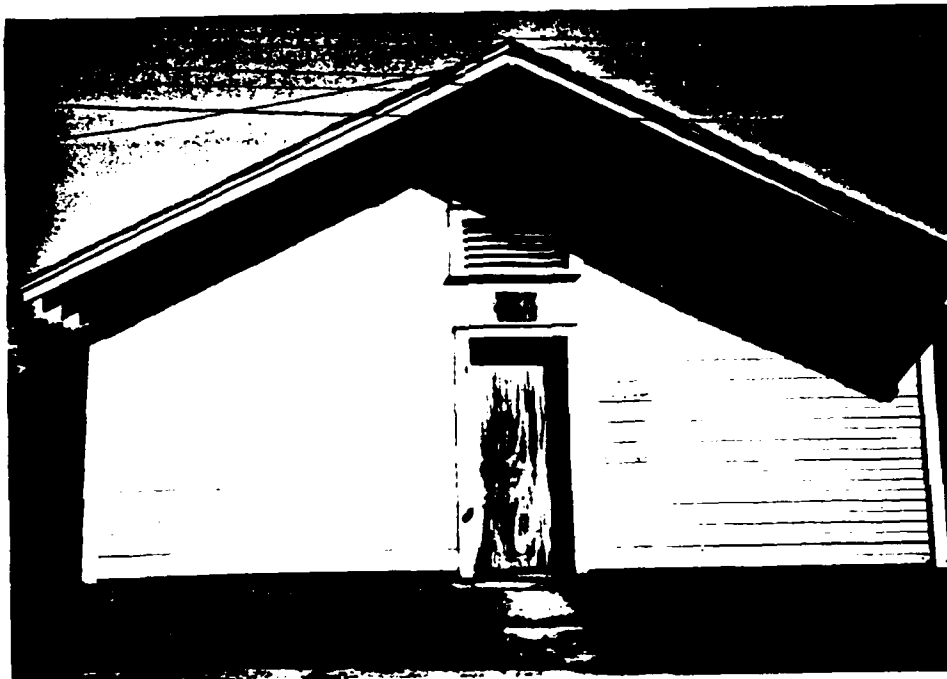
Parish No. _____ Site No. _____

Address N/A

Parish Vermilion

2. PHOTOGRAPHS:

In the space below mount two photos: one of the facade and one of another primary elevation. Any additional photos may be mounted on a separate sheet and attached to this form.



RECORDED BY Jeffrey Treffinger

DATE October 23, 1988

3. TOPOGRAPHIC QUAD:

Name _____ Sect _____ R _____ T _____
Size _____

4. OWNERSHIP:

Name United States Army Corps of Engineers, New Orleans District
Address P.O. Box 60267, New Orleans, Louisiana 70160-0267
Phone 504-865-1121

5. HISTORICAL DATA:

Historic Name Shop- Vermilion Lock Complex
Historic Use building served as wood and mechanical shop for lock facility, also for storage
Original Owner New Orleans District, C.O.E.
Architect/Builder same as above

6. CONDITION:

Good _____ Fair X Deteriorated _____
Remarks a corrugated steel shed has been added to the rear of the structure

7. INTEGRITY:

Unaltered _____ Minor alterations X Major alterations _____
List Major alterations _____

8. RELATED FEATURES:

Historic fencing _____ Well/cistern _____ Cemetery _____
Historic garden/landscaping _____ Other there is a gate at the east side.

9. THREATS TO BUILDING OR SITE:

None X Development _____ Deterioration _____
Road construction _____ Vandalism _____ Zoning _____
Other _____

10. PRIMARY REFERENCES:

Interviews Mr. Harold Trahan, former lockmaster, Vermilion Lock

Documents original construction drawings and photographs were obtained from the New Orleans District, C.O.E.

Published Works see Treffinger, 1988

B. PHYSICAL DESCRIPTION

Describe the structures as completely as possible using the following categories and examples of features as general guidelines. Where applicable, note the location of each feature.

1. CONSTRUCTION/MODIFICATION DATE: 1932

2. ARCHITECTURAL STYLE:

For example: Greek Revival, Italianate, Queen Anne, Colonial Revival, Bungalow, etc.
or combinations and influences thereof

20th Century Military house type.

3. OVERALL BUILDING SHAPE/MASSING:

Note number of stories, plan shape, bays, wings, etc.

One story, rectangular, 2 bays

4. BASIC FLOOR PLAN DESCRIPTION:

For example: shotgun, bungalow, dogtrot, asymmetric, open commercial space, office, gym, etc.

Bungalow

5. FOUNDATION:

Note type (piers, slab, etc.) and material (wood, masonry, concrete, etc.)

concrete slab

6. WALL CONSTRUCTION:

For example: log, balloon framing, bousillage, brick, etc.

balloon framing

7. EXTERIOR MATERIALS:

For example: clapboard, shingle, stucco, etc.

clapboard

8. ROOF CHARACTERISTICS:

Note shape (gable, hip, shed, etc.) and material (slate, tin, tile, asbestos, etc.)

gable sheathed with modern seal tab shingles (the structure has been re-roofed)

8A. ROOF FEATURES:

Note dormers, towers, cupolas, parapets, etc.

none

8B. ROOF TRIM:

Note cornices, entablature, dentils, vergeboards, brackets, exposed rafters, etc.

simple exposed rafters at eaves

9. WINDOWS:

Note type (casement, double hung, French), panes (6/6, 3/1, 1/1), trim/surrounds, shutters, colored panes, stained glass, etc.

casement windows (6/6) no shutters. Simple trim surrounds.

10. DOORS:

Note type, trim/surrounds, shutters, fanlights, pediments, pilasters, transoms, etc.
trim/surrounds

11. PORCHES, GALLERIES AND PORTICOS:

Note location, materials

none

11A. DECORATIVE PORCH/GALLERY/PORTICO FEATURES:

Note columns/posts, capitals, balustrade, spindles, brackets, etc.

none

12. OTHER DECORATIVE DETAILS:

For example: patterned shingles, quoins, half-timbering, etc.

none

13. MAJOR STYLISTIC ELEMENTS/ARTICULATION (if not already described)

For example: Gothic buttresses, open carriageway, Italianate tower, etc.

void of stylistic elements/articulation

14. INTERIOR DETAILS (if accessible):

N/A

C. ARCHITECTURAL SIGNIFICANCE (describe important architectural features and evaluate in terms of other buildings within community)

This structure does not possess the characteristics of any significant building type of stylistic period. Instead, it is a simple utilitarian structure possessing no architectural significance

D. HISTORICAL SIGNIFICANCE (explain the role owners played in local or state history and how the building relates to the development of the community)

This structure did serve the Vermilion Lock complex located on the Gulf Intracoastal Waterway. However, research has concluded that this lock is not a significant facility associated with the Waterway.